Package ‘flowMeans’

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Type Package

Title Non-parametric Flow Cytometry Data Gating

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Description Identifies cell populations in Flow Cytometry data using non-parametric clustering and segmented-regression-based change point detection. Note: R 2.11.0 or newer is required.

Imports Biobase, graphics, grDevices, methods, rrcov, stats, feature, flowCore

Depends R (>= 2.10.0)

License Artistic-2.0

LazyLoad yes

biocViews FlowCytometry, CellBiology, Clustering

NeedsCompilation no

R topics documented:

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flowMeans-package

Description

Non-parametric Flow Cytometry Data Gating

Details
Author(s)

Nima Aghaeepour <naghaeep@bccrc.ca>

Examples

library(flowMeans)
data(x)
plot(x[,c(3,4)], res, c("FL1.H", "FL2.H"))

changepointDetection  Change-Point Detection

Description

Fits a two-component piecewise linear regression to the minimum distance between merged clusters vs the number of clusters for a list of merged cluster solutions.

Usage

changepointDetection(vect, OrthogonalResiduals = FALSE, PlotFlag = FALSE)

Arguments

vect A vector of minimum distances between clusters chosen to be merged at each iteration.
OrthogonalResiduals Boolean value, indicates if the residuals must be transformed to orthogonal distance or not.
PlotFlag Boolean value, indicating if the regression lines must be visualized.

Value

MinIndex Index of the merging step that produced the final results.
11 First regression line used for finding the changepoint for stopping the merging process.
12 Second regression line used for finding the changepoint for stopping the merging process.
Author(s)
Nima Aghaeepour

Examples

library(flowMeans)
data(x)
ft<-changepointDetection(res@Mins)
plot(res@Mins)
abline(ft$l1)
abline(ft$l2)

Description
Finds a good fit to the data using k-means clustering algorithm. Then merges the adjacent dense spherical clusters to find non-spherical clusters.

Usage
flowMeans(x, varNames=NULL, MaxN = NA, NumC = NA, iter.max = 50, nstart = 10, Mahalanobis = TRUE, Standardize = TRUE, Update = "Mahalanobis", OrthogonalResiduals=TRUE, MaxCovN=NA, MaxKernN=NA, addNoise=TRUE)

Arguments
x A matrix, data frame of observations, or object of class flowFrame. Rows correspond to observations and columns correspond to variables.
varNames A character vector specifying the variables (columns) to be included in clustering. When it is left unspecified, all the variables will be used.
MaxN Maximum number of clusters. If set to NA (default) the value will be estimated automatically.
NumC Number of clusters. If set to NA (default) the value will be estimated automatically.
iternax The maximum number of iterations allowed.
nstart The number of random sets used for initialization.
Mahalanobis Boolean value. If TRUE (default) mahalanobis distance will be used. Otherwise, euclidean distance will be used.
Standardize Boolean value. If TRUE (default) the data will be transformed to the [0,1] interval.
Update String value. If set to "Mahalanobis" the distance function will be updated at each merging iteration with recalculating mahalanobis distances. If set to "Mean" the distance matrix will be updated after each merging step with averaging. If set to "None" the distance matrix will not be updated.
flowMeans

MaxCovN  Maximum number of points, used for calculating the covariance. If set to NA (default), all the points will be used.

MaxKernN  Maximum number of points, used for counting the modes using kernel density estimation. If set to NA (default), all the points will be used.

addNoise  Boolean value. Determines if uniform noise must be added to the data to prevent singularity issues or not.

OrthogonalResiduals  Boolean value, indicates if the residuals must be transformed to orthogonal distance or not.

Details

If Mahalanobis distance is not used (i.e., Mahalanobis=FALSE) then the Update value cannot be set to Mahalanobis (i.e., Update="Mahalanobis")

Value

Label  A vector of integers indicating the cluster to which each point is allocated.

Labels  A list of vectors of integers indicating the cluster to which each point is allocated at each merging iteration.

Mats  A list of distance matrixes between clusters at every merging iteration.

MaxN  Maximum number of clusters

Mins  A vector of integers indicating the distance between the two clusters chosen to be merged at every iteration.

MinIndex  Index of the merging step that produced the final results.

Line1  First regression line used for finding the changepoint for stopping the merging process.

Line2  Second regression line used for finding the changepoint for stopping the merging process.

Author(s)

Nima Aghaeepour

Examples

library(flowMeans)
data(x)
plot(x[,c(3,4)], res, c("FL1.H", "FL2.H"))
**plot**

*Scatterplot of Clustering Results*

**Description**

This method generates scatterplot revealing the cluster assignment.

**Usage**

```r
## S4 method for signature 'ANY,Populations'
plot(x, y, varNames=NULL, ...)
## S4 method for signature 'flowFrame,Populations'
plot(x, y, varNames=NULL, ...)```

**Arguments**

- `x`: A matrix, data frame of observations, or object of class `flowFrame`. This is the object on which `flowClust` was performed.
- `y`: Object returned from `flowMeans`.
- `varNames`: A character vector specifying the variables (columns) to be included in the plot. When it is left unspecified, all the variables will be used.
- `...`: Extra parameters that will be passed to the generic plot function

**Author(s)**

Nima Aghaeepour `<naghaeep@bccrc.ca>`

**See Also**

`flowMeans`

**Examples**

```r
library(flowMeans)
data(x)
plot(data.frame(x))```

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**show**

*Show Method for Populations Class*

**Description**

This method lists out the slots contained in a `Populations` object.

**Usage**

```r
## S4 method for signature 'Populations'
show(object)```
Arguments

object  Object returned from flowMeans

Author(s)

Nima Aghaeepour <<naghaeep@bccrc.ca>>

See Also

flowMeans

Description

This method prints out various characteristics of the populations found by flowMeans.

Usage

## S4 method for signature 'Populations'
summary(object,...)

Arguments

object  Object returned from flowMeans.
...  Object returned from flowMeans.

Details

This method prints out various characteristics of the populations found by flowMeans.

Author(s)

Nima Aghaeepour <<naghaeep@bccrc.ca>>

See Also

flowMeans
Description

A flow cytometry sample produced for diagnosis of the Graft versus Host Disease (GvHD)

Usage

data(x)

Format

A matrix describing expression values of 6 markers and 14936 cells. Each column represents a marker and each row represents a cell.

Source


Examples

data(x)
## maybe str(x) ; plot(x) ...
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