

arrayMvout

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ArrayOutliers-methods

ArrayOutliers – wrapper for platform-specific multivariate outlier detection for expression arrays

Description

wraps functions that perform multivariate outlier detection on dimension-reduced QA statistics of expression arrays

Methods

data = "ANY", alpha = "missing", alphaSeq = "missing" fails; tells user that alpha is obligatory parameter

data = "AffyBatch", alpha = "numeric", alphaSeq = "ANY" performs calibrated multivariate outlier detection on an AffyBatch instance using various affy-specific QA parameters

data = "LumiBatch", alpha = "numeric", alphaSeq = "ANY" performs calibrated multivariate outlier detection on an LumiBatch instance using various illumina-specific QA parameters

data = "data.frame", alpha = "numeric", alphaSeq = "ANY" performs calibrated outlier detection on QA statistics housed in data.frame – all columns of the data entity must be numeric QA statistics for the arrays.

Examples

```
example(ArrayOutliers)
```

ArrayOutliers

Multivariate outlier detection based on PCA of QA statistics

Description

Multivariate outlier detection based on PCA of QA statistics

Usage

```
ArrayOutliers (data, alpha, alphaSeq = c(0.01, 0.05, 0.1), ... )
#   qcOutput = NULL, plmOutput = NULL, degOutput = NULL, prscale = TRUE,
#   pc2use = 1:3)
```

Arguments

<code>data</code>	an (affy) <code>AffyBatch</code> instance with at least 11 samples
<code>alpha</code>	false positive rate for outlier detection, adjusting for multiple comparisons according to Caroni and Prescott's adaptation of Rosner (1983); full report based on this choice of alpha
<code>alphaSeq</code>	vector of alpha candidates to be quickly tried for short report
<code>...</code>	additional parameters, see below

Details

Additional parameters may be supplied

qcOutput optional result of `simpleaffy qc()` to speed computations

plmOutput optional result of `affyPLM fitPLM()` to speed computations

degOutput optional result of `affy AffyRNAdeg()` to speed computations

prscale scaling option for `prcomp`

pc2use selection of principal components to use for outlier detection

Data elements `afxsubDEG`, `afxsubQC`, `s12cDEG`, `s12cQC` are precomputed RNA degradation and `simpleaffy qc()` results; `s12c` is an `AffyBatch` with digital contamination of some samples.

Data elements `maqcQA` and `itnQA` are affymetrix QC statistics on large collections of arrays. Data element `ilmQA` is derived from a `LumiBatch` of the Illumina-submitted MAQC raw data, 19 arrays. (Conveyed by Leming Shi, personal communication). Data element `spikQA` is a 12x9 matrix of QA parameters obtained for 12 arrays from U133A spikein dataset, with first 2 arrays digitally contaminated as described in Asare et al.

Data element `fig3map` gives the indices of the points labeled A-H in Figure 3 of the manuscript by Asare et al. associated with this package.

Value

an instance of `arrOutStruct` class, a list with a partition of samples into two data frames (`inl` and `outl`) with QA summary statistics

Author(s)

Z. Gao et al.

Examples

```

library(simpleaffy)
setQCEnvironment("hgu133acdf") # no CDF corresponding to tag array
if ( require("mvoutData") ) {
  data(s12c)
  data(s12cQC)
  data(s12cDEG)
  library(affyPLM)
  s12cPset = fitPLM(s12c)
  ao = ArrayOutliers(s12c, alpha=0.05, qcOut=s12cQC, plmOut=s12cPset, degOut=s12cDEG)
  ao
}
if (require("lumiBarnes")) {
  library(lumiBarnes)
  data(lumiBarnes)
  ArrayOutliers(lumiBarnes, alpha=0.05)
  lb2 = lumiBarnes
  exprs(lb2)[1:20000,1:2] = 10000*exprs(lb2)[1:20000,1:2]
  ArrayOutliers(lb2, alpha=0.05)
}
data(maqcQA) # affy
ArrayOutliers(maqcQA[, -c(1:2)], alpha=.05)
ArrayOutliers(maqcQA[, -c(1:2)], alpha=.01)
data(ilmQA) # illumina
ArrayOutliers(data.frame(ilmQA), alpha=.01)
data(itnQA) # 507 arrays from ITN
ArrayOutliers(itnQA, alpha=.01)

```

arrOutStruct-class *Class "arrOutStruct" container for ArrayOutliers output*

Description

Class "arrOutStruct" container for ArrayOutliers output

Objects from the Class

Objects can be created by calls of the form `new("arrOutStruct", ...)`. This class just extends `list` but has specialized `show` and `plot` methods.

Extends

Class "`list`", from data part. Class "`vector`", by class "list", distance 2. Class `AssayData`, by class "list", distance 2.

Methods

plot signature(x = "arrOutStruct", y = "ANY"): a biplot of QA statistics

show signature(object = "arrOutStruct"): summary report

Author(s)

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Examples

```
data(maqcQA)
f1 = ArrayOutliers(maqcQA[, -c(1:2)], alpha=0.01)
names(f1)
f1
```

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