Package 'CytoML'

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Type Package

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`addCustomInfo` *add customInfo nodes to each gate node and add BooleanAndGates*

Description

add customInfo nodes to each gate node and add BooleanAndGates

Usage

```
addCustomInfo(root, gs, flowEnv, cytobank.default.scale = TRUE, showHidden)
```

Arguments

`root`	the root node of the XML
`gs`	a GatingSet object
`flowEnv`	the environment that stores the information parsed by 'read.GatingML'.
`cytobank.default.scale`	logical flag indicating whether to use the default Cytobank asinhtGml2 settings. Currently it should be set to TRUE in order for gates to be displayed properly in Cytobank because cytobank currently does not parse the global scale settings from GatingML.
`showHidden`	whether to include the hidden population nodes in the output

Value

XML root node

ce_get_channels *Extract channels from cytobank_experiment*

Description

Extract channels from cytobank_experiment

Usage

```
ce_get_channels(x, panel_name = NULL)
```

Arguments

x	A cytobank_experiment object
panel_name	select panel to process

ce_get_compensations *Obtain the spillover matrices for the samples in a Cytobank experiment*

Description

Obtain the spillover matrices for the samples in a Cytobank experiment

Usage

```
ce_get_compensations(x)
```

Arguments

x	A cytobank_experiment object

Value

A named list of spillover matrices

ce_get_markers *Extract markers from cytobank_experiment*

Description

Extract markers from cytobank_experiment

Usage

```
ce_get_markers(x, panel_name = NULL)
```

Arguments

x	A cytobank_experiment object
panel_name	select panel to process

ce_get_panels *Obtain counts of the number of samples associated with each marker panel in a Cytobank experiment*

Description

Obtain counts of the number of samples associated with each marker panel in a Cytobank experiment

Usage

```
ce_get_panels(x)
```

Arguments

x	cytobank_experiment object

Value

A tibble of panels with sample counts

ce_get_samples *Obtain a mapping between the samples and marker panels in a Cytobank experiment*

Description

Obtain a mapping between the samples and marker panels in a Cytobank experiment

Usage

```
ce_get_samples(x)
```

Arguments

x	A cytobank_experiment object

Value

A tibble with rows containing sample names and their associated panel names

ce_get_transformations *Obtain the transformations associated with each channel in a Cytobank experiment*

Description

Obtain the transformations associated with each channel in a Cytobank experiment

Usage

```
ce_get_transformations(x, panel_name = NULL)
```

Arguments

x	A cytobank_experiment object
panel_name	select panel to process

Value

A transformerList object containing transformation objects for each transformed channel

compensate,GatingSet,graphGML-method

compensate a GatingSet based on the compensation information stored in graphGML object

Description

compensate a GatingSet based on the compensation information stored in graphGML object

Usage

```
## S4 method for signature 'GatingSet,graphGML'
compensate(x, spillover, ...)
```

Arguments

x	GatingSet
spillover	graphGML
...	unused.

Value

compensated GatingSet

constructTree *Reconstruct the population tree from the GateSets*

Description

Reconstruct the population tree from the GateSets

Usage

```
constructTree(flowEnv, gateInfo)
```

Arguments

flowEnv	the enivornment contains the elements parsed by read.gatingML function
gateInfo	the data.frame contains the gate name, fcs filename parsed by parse.gateInfo function

Value

a graphNEL represent the population tree. The gate and population name are stored as nodeData in each node.

---

cytobank_experiment-methods *Methods for interacting with cytobank_experiment objects*

Description

These methods mirror similar accessor methods for the GatingSet class.

Usage

```
## S4 method for signature 'cytobank_experiment'
markernames(object)

## S4 method for signature 'cytobank_experiment'
colnames(x, do.NULL = "missing", prefix = "missing")

## S4 method for signature 'cytobank_experiment'
sampleNames(object)

## S4 method for signature 'cytobank_experiment'
pData(object)
```

Arguments

object	A cytobank_experiment object
x	cytobank_experiment
do.NULL, prefix	not used

---

cytobank_to_gatingset *A wrapper that parses the gatingML and FCS files (or* cytobank_experiment *object) into GatingSet*

Description

A wrapper that parses the gatingML and FCS files (or cytobank_experiment object) into GatingSet

Usage

```
## Default S3 method:
cytobank_to_gatingset(x, FCS, trans = NULL, ...)

## S3 method for class 'cytobank_experiment'
cytobank_to_gatingset(x, panel_id = 1, ...)
```

Arguments

x	the cytobank_experiment object or the full path of gatingML file
FCS	FCS files to be loaded
trans	a 'transfomerList' object to override the transformations from gatingML files. it is typically used by 'cytobank_experiment' parser(i.e. 'cytobank_to_gatingset.cytobank_experiment') to use the scales info recorded in yaml file.
...	other arguments
panel_id	select panel to process

Value

a GatingSet

Examples

```
## Not run:
acsfile <- system.file("extdata/cytobank_experiment.acs", package = "CytoML")
ce <- open_cytobank_experiment(acsfile)
xmlfile <- ce$gatingML
fcsFiles <- list.files(ce$fcsdir, full.names = TRUE)
gs <<- cytobank_to_gatingset(xmlfile, fcsFiles)
library(ggcyto)
autoplot(gs[[1]])

## End(Not run)
```

CytoML-deprecated *Deprecated functions in package* **CytoML**.

Description

GatingSet2cytobank –> gatingset_to_cytobank

GatingSet2flowJo –> gatingset_to_flowjo

cytobankExperiment –> open_cytobank_experiment

cytobank2GatingSet –> cytobank_to_gatingset

parseWorkspace –> flowjo_to_gatingset

getKeywords –> fj_ws_get_keywords

getSamples –> fj_ws_get_samples

getSampleGroups –> fj_ws_get_sample_groups

openDiva –> open_diva_xml

parseWorkspace –> diva_to_gatingset

diva_get_samples *Get a table of samples from a FACSDiva workspace*

Description

Return a data.frame of sample group information from a FACSDiva workspace

Usage

```
diva_get_samples(x)
diva_get_sample_groups(x)
```

Arguments

x	A diva_workspace

Value

A data.frame with columns tub, name, and specimen

diva_to_gatingset *Parse a FACSDiva Workspace*

Description

Function to parse a FACSDiva Workspace, generate a GatingHierarchy or GatingSet object, and associated flowCore gates.

Usage

```
diva_to_gatingset(
  obj,
  name = NULL,
  subset = NULL,
  path = obj@path,
  worksheet = c("normal", "global"),
  swap_cols = list(`FSC-H` = "FSC-W", `SSC-H` = "SSC-W"),
  verbose = FALSE,
  ...
)
```

Arguments

obj	diva_workspace
name	sample group to be parsed, either numeric index or the group name
subset	samples to be imported. either numeric index or the sample name. Default is NULL, which imports all samples.
path	the FCS data path
worksheet	select worksheet to import. either "normal" or "global"
swap_cols	diva seems to swap some data cols during importing fcs to experiments this argument provide a list to tell the parser which cols to be swapped default is list('FSC-H' = 'FSC-W','SSC-H' = 'SSC-W')
verbose	whether print more messages during the parsing
...	other arguments

---

diva_workspace-class *An R representation of a BD FACSDiva workspace*

Description

Inherited from flowjo_workspace-class

Slots

version: Object of class "character". The version of the XML workspace.

file: Object of class "character". The file name.

.cache: Object of class "environment". An environment for internal use.

path: Object of class "character". The path to the file.

doc: Object of class "XMLInternalDocument". The XML document object.

options: Object of class "integer". The XML parsing options passed to xmlTreeParse.

See Also

GatingSet GatingHierarchy

`extend` *extend the gate to the minimum and maximum limit of both dimensions based on the bounding information.*

Description

It is equivalent to the behavior of shifting the off-scale boundary events into the gate boundary that is described in bounding transformation section of gatingML standard.

Usage

```
extend(
  gate,
  bound,
  data.range = NULL,
  plot = FALSE,
  limits = c("original", "extended")
)

## S3 method for class 'polygonGate'
extend(
  gate,
  bound,
  data.range = NULL,
  plot = FALSE,
  limits = c("original", "extended")
)

## S3 method for class 'rectangleGate'
extend(gate, ...)

## S3 method for class 'ellipsoidGate'
extend(gate, ...)
```

Arguments

`gate`	a flowCore filter/gate
`bound`	numeric matrix representing the bouding information parsed from gatingML. Each row corresponds to a channel. rownames should be the channel names. colnames should be c("min", "max")
`data.range`	numeric matrix specifying the data limits of each channel. It is used to set the extended value of vertices and must has the same structure as 'bound'. when it is not supplied, c(-.Machine$integer.max, - .Machine$integer.max) is used.
`plot`	whether to plot the extended polygon.
`limits`	character whether to plot in "extended" or "original" gate limits. Default is "original".
`...`	other arguments

Details

The advantage of extending gates instead of shifting data are two folds: 1. Avoid the extra computation each time applying or plotting the gates 2. Avoid changing the data distribution caused by adding the gates

Normally this function is not used directly by user but invoked when parsing GatingML file exported from Cytobank.

Value

a flowCore filter/gate

Examples

```
library(flowCore)
sqrcut <- matrix(c(300,300,600,600,50,300,300,50),ncol=2,nrow=4)
colnames(sqrcut) <- c("FSC-H","SSC-H")
pg <- polygonGate(filterId="nonDebris", sqrcut)
pg
bound <- matrix(c(100,3e3,100,3e3),
    byrow = TRUE, nrow = 2,
   dimnames = list(c("FSC-H", "SSC-H"),
     c("min", "max")))
bound
pg.extened <- extend(pg, bound, plot = TRUE)
```

---

fj_ws_get_keywords *Get Keywords*

Description

Retrieve keywords associated with a workspace

Usage

```
fj_ws_get_keywords(obj, y, ...)
```

Arguments

obj	A flowjo_workspace
y	ccharacter or numeric specifying the sample name or sample ID
...	other arguments sampNloc a character the location where the sample name is specified. See parseWorkspace for more details.

Details

Retrieve a list of keywords from a flowjo_workspace

Value

A list of keyword - value pairs.

Examples

```
## Not run:
  d<-system.file("extdata",package="flowWorkspaceData")
  wsfile<-list.files(d,pattern="manual.xml",full=TRUE)
  ws <- open_flowjo_xml(wsfile)

  fj_ws_get_samples(ws)
  res <- try(fj_ws_get_keywords(ws,"CytoTrol_CytoTrol_1.fcs"), silent = TRUE)
  print(res[[1]])
  fj_ws_get_keywords(ws, 1)

## End(Not run)
```

`fj_ws_get_samples` *Get a list of samples from a flowJo workspace*

Description

Return a data frame of samples contained in a flowJo workspace

Usage

```
fj_ws_get_samples(x, group_id = NULL)
```

Arguments

`x`	A `flowjo_workspace`
`group_id`	`integer` specifies the group from which samples are returned

Details

The samples with 0 populations are excluded. Returns a `data.frame` of samples in the `flowjo_workspace`, including their `sampleID`, `name`

Value

A `data.frame` with columns `sampleID`, `name`

Examples

```
      ## Not run:
        #ws is a flowjo_workspace
        fj_ws_get_samples(ws);

## End(Not run)
```

fj_ws_get_sample_groups *Get a table of sample groups from a flowJo workspace*

Description

Return a data frame of sample group information from a flowJo workspace

Usage

```
fj_ws_get_sample_groups(x)
```

Arguments

x	A flowjo_workspace object.

Details

Note that the samples with 0 populations are also included (since count populations requires traversing xml for all samples thus can be expensive) Returns a table of samples and groups defined in the flowJo workspace

Value

A data.frame containing the groupName, groupID, and sampleID for each sample in the workspace. Each sample may be associated with multiple groups.

See Also

flowjo_workspace-class flowjo_to_gatingset

Examples

```
  ## Not run:
    #ws is a flowjo_workspace
    fj_ws_get_sample_groups(ws);

## End(Not run)
```

flowjo_workspace-class

An R representation of a flowJo workspace.

Description

Objects can be created by calls of the form `new("flowjo_workspace.xml", ...)`.

Slots

doc: Object of class `"externalptr"`.

See Also

GatingSet GatingHierarchy

Examples

```
require(flowWorkspaceData)
d<-system.file("extdata",package="flowWorkspaceData")
wsfile<-list.files(d,pattern="A2004Analysis.xml",full=TRUE)
ws <- open_flowjo_xml(wsfile);
ws
fj_ws_get_samples(ws)
```

gatingset_to_cytobank *Convert a GatingSet to a Cytobank-compatible gatingML*

Description

this function retrieves the gates from GatingSet and writes a customed GatingML-2.0 file that can be imported into cytobank.

Usage

```
gatingset_to_cytobank(
  gs,
  outFile,
  showHidden = FALSE,
  cytobank.default.scale = TRUE,
  ...
)
```

Arguments

gs	a GatingSet object
outFile	a file name
showHidden	whether to include the hidden population nodes in the output
cytobank.default.scale	logical flag indicating whether to use the default Cytobank asinhtGml2 settings. Currently it should be set to TRUE in order for gates to be displayed properly in Cytobank because cytobank currently does not parse the global scale settings from GatingML.
...	rescale.gate default is TRUE. which means the gate is rescaled to the new scale that is understandable by cytobank. It is recommended not to change this behavior unless user wants to export to a gatingML file used for other purpose other than being imported into cytobank.

Details

The process can be divided into four steps: 1. Read in gate geometry, compensation and transformation from gatingSet 2. Rescale gate boundaries with flowjo_biexp() so gates can be displayed properly in Cytobank 3. Save gates and hierarchy structure to R environment 4. Write environment out to gatingML using write.GatingML()

Value

nothing

Examples

```
library(flowWorkspace)

dataDir <- system.file("extdata",package="flowWorkspaceData")
gs <- load_gs(list.files(dataDir, pattern = "gs_manual",full = TRUE))

gs_pop_remove(gs, "CD8")

#output to cytobank
outFile <- tempfile(fileext = ".xml")
gatingset_to_cytobank(gs, outFile) #type by default is 'cytobank'
```

---

gatingset_to_flowjo *Convert a GatingSet to flowJo workspace*

Description

It is a R wrapper for the docker app (https://hub.docker.com/r/rglab/gs-to-flowjo)

Usage

```
gatingset_to_flowjo(gs, outFile, showHidden = FALSE, docker_img = NULL, ...)
```

Arguments

gs	a GatingSet object or a folder contains the GatingSet archive (generated by previous save_gs call)
outFile	the workspace file path to write
showHidden	whether to export hidden gates. Default is FALSE
docker_img	the docker image that does the actual work
...	other arguments passed to save_gs

Details

Docker images for `gatingset_to_flowjo` will be maintained at https://gallery.ecr.aws/x4k5d9i7/cytoverse/gs-to-wsp

`docker pull public.ecr.aws/x4k5d9i7/cytoverse/gs-to-wsp:latest`

Value

nothing

Examples

```
## Not run:
library(flowWorkspace)

path <- system.file("extdata",package="flowWorkspaceData")
gs_path <- list.files(path, pattern = "gs_manual",full = TRUE)
gs <- load_gs(gs_path)

#output to flowJo
outFile <- tempfile(fileext = ".wsp")
gatingset_to_flowjo(gs, outFile)

#or directly use the archive as the input (to avoid the extra copying inside of the wrapper)
gatingset_to_flowjo(gs_path, outFile)

## End(Not run)
```

getChildren,graphGML,character-method
get children nodes

Description

get children nodes

Usage

```
## S4 method for signature 'graphGML,character'
getChildren(obj, y)
```

Arguments

obj	graphGML
y	character parent node path

Value

a graphNEL node

Examples

```
## Not run:
g <- read.gatingML.cytobank(xmlfile)
getChildren(g, "GateSet_722326")
getParent(g, "GateSet_722326")

## End(Not run)
```

getCompensationMatrices.graphGML
Extract compensation from graphGML object.

Description

Extract compensation from graphGML object.

Usage

```
## S3 method for class 'graphGML'
getCompensationMatrices(x)
```

Arguments

x	graphGML

Value

compensation object or "FCS" when compensation comes from FCS keywords

---

getGate,graphGML,character-method

get gate from the node

Description

get gate from the node

Usage

```
## S4 method for signature 'graphGML,character'
getGate(obj, y)
```

Arguments

obj	graphGML
y	character node path

Value

the gate information associated with the node

---

getNodes,graphGML-method

get nodes from graphGML object

Description

get nodes from graphGML object

Usage

```
## S4 method for signature 'graphGML'
getNodes(x, y, order = c("default", "bfs", "dfs", "tsort"), only.names = TRUE)
```

Arguments

x	graphGML
y	character node index. When missing, return all the nodes
order	character specifying the order of nodes. options are "default", "bfs", "dfs", "tsort"
only.names	logical specifiying whether user wants to get the entire nodeData or just the name of the population node

Value

It returns the node names and population names by default. Or return the entire nodeData associated with each node.

Examples

```
## Not run:
g <- read.gatingML.cytobank(xmlfile)
getNodes(g)
getNodes(g, only.names = FALSE)

## End(Not run)
```

---

getParent,graphGML,character-method
get parent nodes

Description

get parent nodes

Usage

```
## S4 method for signature 'graphGML,character'
getParent(obj, y)
```

Arguments

obj	graphGML
y	character child node path

Value

a graphNEL node

---

getTransformations.graphGML
Extract transformations from graphGML object.

Description

Extract transformations from graphGML object.

Usage

```
## S3 method for class 'graphGML'
getTransformations(x, ...)
```

Arguments

x	graphGML
...	not used

Value

transformerList object

---

graphGML-class *A graph object returned by 'read.gatingML.cytobank' function.*

Description

Each node corresponds to a population(or GateSet) defined in gatingML file. The actual gate object (both global and tailored gates) is associated with each node as nodeData. Compensation and transformations are stored in graphData slot.

Details

The class simply extends the graphNEL class and exists for the purpose of method dispatching.

---

gs_compare_cytobank_counts *compare the counts to cytobank's exported csv so that the parsing result can be verified.*

Description

compare the counts to cytobank's exported csv so that the parsing result can be verified.

Usage

```
gs_compare_cytobank_counts(
  gs,
  file,
  id.vars = c("FCS Filename", "population"),
  ...
)
```

Arguments

gs	parsed GatingSet
file	the stats file (contains the populatio counts) exported from cytobank.
id.vars	either "population" or "FCS filename" that tells whether the stats file format is one population per row or FCS file per row.
...	arguments passed to data.table::fread function

Value

a data.table (in long format) that contains the counts from openCyto and Cytobank side by side.

Examples

```
acsfile <- system.file("extdata/cytobank_experiment.acs", package = "CytoML")
ce <- open_cytobank_experiment(acsfile)
gs <- cytobank_to_gatingset(ce)
## verify the stats are correct
statsfile <- ce$attachments[1]
dt_merged <- gs_compare_cytobank_counts(gs, statsfile, id.vars = "population", skip = "FCS Filename")
all.equal(dt_merged[, count.x], dt_merged[, count.y], tol = 5e-4)
```

---

matchPath — *Given the leaf node, try to find out if a collection of nodes can be matched to a path in a graph(tree) by the bottom-up searching*

Description

Given the leaf node, try to find out if a collection of nodes can be matched to a path in a graph(tree) by the bottom-up searching

Usage

```
matchPath(g, leaf, nodeSet)
```

Arguments

g	graphNEL
leaf	the name of leaf(terminal) node
nodeSet	a set of node names

Value

TRUE if path is found, FALSE if not path is matched.

open_cytobank_experiment *Construct a* cytobank_experiment *object from ACS file*

Description

Construct a cytobank_experiment object from ACS file

Usage

```
open_cytobank_experiment(acs, exdir = tempfile())
```

Arguments

acs	ACS file exported from Cytobank
exdir	he directory to extract files to

Value

cytobank_experiment object

open_diva_xml *open Diva xml workspace*

Description

open Diva xml workspace

Usage

```
open_diva_xml(file, options = 0, ...)
```

Arguments

file	xml file
options	argument passed to xmlTreeParse
...	arguments passed to xmlTreeParse

Value

a diva_workspace object

Examples

```
## Not run:
library(flowWorkspace)
library(CytoML)
ws <- open_diva_xml(system.file('extdata/diva/PE_2.xml', package = "flowWorkspaceData"))
ws
diva_get_sample_groups(ws)
gs <- diva_to_gatingset(ws, name = 2, subset = 1)
sampleNames(gs)
gs_get_pop_paths(gs)
plotGate(gs[[1]])

## End(Not run)
```

`open_flowjo_xml` *Open/Close a flowJo workspace*

Description

Open a flowJo workspace and return a `flowjo_workspace` object. Close a flowjo_workspace, destroying the internal representation of the XML document, and freeing the associated memory.

Usage

```
open_flowjo_xml(file, options = 0, sample_names_from = "keyword", ...)
```

Arguments

`file`	Full path to the XML flowJo workspace file.
`options`	xml parsing options passed to `xmlTreeParse`. See http://xmlsoft.org/html/libxml-parser.html#xmlParserOption for details.
`sample_names_from`	character specifying where in the XML workspace file to obtain the sample names, either "keyword" for the included $FIL keyword for each sample, or "sampleNode" for the name of the sample node
`...`	not used

Details

Open an XML flowJo workspace file and return a `flowjo_workspace` object. The workspace is represented using a `XMLInternalDocument` object. Close a flowJoWorkpsace after finishing with it. This is necessary to explicitly clean up the C-based representation of the XML tree. (See the XML package).

Value

a `flowjo_workspace` object.

Examples

```
## Not run:
 file<-"myworkspace.xml"
 ws<-open_flowjo_xml(file);
 ws

## End(Not run)
```

`parse.gateInfo` *Parse the cytobank custom_info for each gate*

Description

Fcs filename and gate name stored in 'custom_info' element are beyong the scope of the gatingML standard and thus not covered by the default 'read.gatingML'.

Usage

```
parse.gateInfo(file, ...)
```

Arguments

`file`	xml file path
`...`	additional arguments passed to the handlers of 'xmlTreeParse'

Value

a data.frame that contains three columns: id (gateId), name (gate name), fcs (fcs_file_filename).

`parseWorkspace` *Parse a flowJo Workspace*

Description

Function to parse a flowJo Workspace, generate a `GatingHierarchy` or `GatingSet` object, and associated flowCore gates. The data are not loaded or acted upon until an explicit call to `recompute()` is made on the `GatingHierarchy` objects in the `GatingSet`.

Usage

```
parseWorkspace(obj, ...)

## S4 method for signature 'flowjo_workspace'
parseWorkspace(obj, ...)

flowjo_to_gatingset(
  ws,
  name = NULL,
  subset = list(),
  execute = TRUE,
  path = "",
  cytoset = NULL,
  backend_dir = tempdir(),
  backend = get_default_backend(),
  includeGates = TRUE,
  additional.keys = "$TOT",
  additional.sampleID = FALSE,
  keywords = character(),
  keywords.source = "XML",
  keyword.ignore.case = FALSE,
  extend_val = 0,
  extend_to = -4000,
  channel.ignore.case = FALSE,
  leaf.bool = TRUE,
  include_empty_tree = FALSE,
  skip_faulty_gate = FALSE,
  compensation = NULL,
  transform = TRUE,
  fcs_file_extension = ".fcs",
  greedy_match = FALSE,
  mc.cores = 1,
  ...
)
```

Arguments

obj	flowjo_workspace
...	Additional arguments to be passed to FCS parser
ws	A flowjo_workspace to be parsed.
name	numeric or character. The name or index of the group of samples to be imported. If NULL, the groups are printed to the screen and one can be selected interactively. Usually, multiple groups are defined in the flowJo workspace file.
subset	numeric vector specifying the subset of samples in a group to import. Or a character specifying the FCS filenames to be imported. Or an expression to be passed to 'subset' function to filter samples by 'pData' (Note that the columns

referred by the expression must also be explicitly specified in 'keywords' argument)

`execute` TRUE|FALSE a logical specifying if the gates, transformations, and compensation should be immediately calculated after the flowJo workspace have been imported. TRUE by default.

`path` either a `character` scalar . it is a path to the fcs files that are to be imported. The code will search recursively, so you can point it to a location above the files.

`cytoset` a `cytoset` object that provides the alternative data source other than FCS files. It is useful sometime to preprocess the raw fcs files (e.g. standardize channels using `cytoqc` package) and then directly use them for flowJo parsing. when cytoset is provided, `path` argument is ignored.

`includeGates` `logical` Should gates be imported, or just the data with compensation and transformation?

`additional.keys`
`character` vector: The keywords (parsed from FCS header) to be combined(concatenated with "_") with FCS filename to uniquely identify samples. Default is '$TOT' (total number of cells) and more keywords can be added to make this GUID.

`additional.sampleID`
`boolean`: A boolean specifying whether to include the flowJo sample ID in a GUID to uniquely identify samples. This can be helpful when the filename or other keywords are not enough to differentiate between samples. Default is FALSE.

`keywords` `character` vector specifying the keywords to be extracted as pData of GatingSet

`keywords.source`
`character` the place where the keywords are extracted from, can be either "XML" or "FCS"

`keyword.ignore.case`
a `logical` flag indicates whether the keywords matching needs to be case sensitive.

`extend_val` `numeric` the threshold that determine wether the gates need to be extended. default is 0. It is triggered when gate coordinates are below this value.

`extend_to` `numeric` the value that gate coordinates are extended to. Default is -4000. Usually this value will be automatically detected according to the real data range. But when the gates needs to be extended without loading the raw data (i.e. `execute` is set to FALSE), then this hard-coded value is used.

`channel.ignore.case`
a `logical` flag indicates whether the colnames(channel names) matching needs to be case sensitive (e.g. compensation, gating..)

`leaf.bool` a `logical` whether to compute the leaf boolean gates. Default is TRUE. It helps to speed up parsing by turning it off when the statistics of these leaf boolean gates are not important for analysis. (e.g. COMPASS package will calculate them by itself.) If needed, they can be calculated by calling `recompute` method at later stage.

`include_empty_tree`
a `logical` whether to include samples that don't have gates.

skip_faulty_gate
: a logical whether to skip the faulty gates so that the parser can still process the rest of gating tree.

compensation
: a compensation object, matrix or data.frame or a list of these objects that allow the customized compensation () to be used instead of the one specified in flowJo workspace or FCS file. When it is a list, its names is supposed to be matched to sample guids (Default is the fcs filename suffixed by $TOT. See "additional.keys" arguments for details of guids) When some of the samples don't have the external compensations matched, it will fall back to the flowJo xml or FCS looking for the compensation matrix.

transform
: logical to enable/disable transformation of gates and data. Default is TRUE. It is mainly for debug purpose (when the raw gates need to be parsed.), and only valid when execute is FALSE.

fcs_file_extension
: default is ".fcs"

greedy_match
: logical: By default, if flowjo_to_gatingset finds multiple FCS files matching a sample by total event count as well as sampleID and/or keywords specified by additional.keys and additional.sampleID, it will return an error listing the duplicate files. If greedy_match is TRUE, the method will simply take the first file with either filename or $FIL keyword matching the sample name and having the correct number of events.

mc.cores
: numeric the number of threads to pass to the C++ parser to run in parallel

h5_dir
: the path to write h5 data

Details

A flowjo_workspace is generated with a call to open_flowjo_xml(), passing the name of the xml workspace file. This returns a flowjo_workspace, which can be parsed using the flowjo_to_gatingset() method. The function can be called non-interactively by passing the index or name of the group of samples to be imported via flowjo_to_gatingset(obj,name=x), where x is either the numeric index, or the name. The subset argument allows one to select a set of files from the chosen sample group. The routine will take the intersection of the files in the sample group, the files specified in subset and the files available on disk, and import them.

Value

a GatingSet, which is a wrapper around a list of GatingHierarchy objects, each representing a single sample in the workspace. The GatingHierarchy objects contain graphNEL trees that represent the gating hierarchy of each sample. Each node in the GatingHierarchy has associated data, including the population counts from flowJo, the parent population counts, the flowCore gates generated from the flowJo workspace gate definitions. Data are not yet loaded or acted upon at this stage. To execute the gating of each data file, a call to execute() must be made on each GatingHierarchy object in the GatingSet. This is done automatically by default, and there is no more reason to set this argument to FALSE.

See Also

fj_ws_get_sample_groups,GatingSet

Examples

```
## Not run:
  #f is a xml file name of a flowJo workspace
 ws <- open_flowjo_xml(f)
 #parse the second group
 gs <- flowjo_to_gatingset(ws, name = 2); #assume that the fcs files are under the same folder as workspace


 gs <- flowjo_to_gatingset(ws, name = 4
                         , path = dataDir     #specify the FCS path
                , subset = "CytoTrol_CytoTrol_1.fcs")    #subset the parsing by FCS filename



 gs <- flowjo_to_gatingset(ws, path = dataDir, name = 4
                 , keywords = c("PATIENT ID", "SAMPLE ID", "$TOT", "EXPERIMENT NAME") #tell the parser to extract ke
                 , keywords.source = "XML" # keywords are extracted from xml workspace (alternatively can be set to
                 , additional.keys = c("PATIENT ID") #use additional keywords together with FCS filename to uniquel
                 , execute = F) # parse workspace without the actual gating (can save time if just want to get the in

#subset by pData (extracted from keywords)
gs <- flowjo_to_gatingset(ws, path = dataDir, name = 4
                         , subset = `TUBE NAME` %in% c("CytoTrol_1", "CytoTrol_2")
                         , keywords = "TUBE NAME")


#overide the default compensation defined in xml with the customized compenstations
gs <- flowjo_to_gatingset(ws, name = 2, compensation = comps); #comp is either a compensation object or a list of com

## End(Not run)
```

`plot,graphGML,missing-method`

plot the population tree stored in graphGML.

Description

The node with dotted order represents the population that has tailored gates (sample-specific gates) defined.

Usage

```
## S4 method for signature 'graphGML,missing'
plot(x, y = "missing", label = c("popName", "gateName"))
```

Arguments

x	a graphNEL generated by constructTree function
y	not used

label	specifies what to be dispaled as node label. Can be either 'popName' (population name parsed from GateSets) or 'gateName'(the name of the actual gate associated with each node)

Value

nothing

Examples

```
## Not run:
g <- read.gatingML.cytobank(xmlfile)
plot(g)

## End(Not run)
```

---

range.GatingHierarchy *the parameter range from the flow data associated with GatingHierarchy*

Description

the parameter range from the flow data associated with GatingHierarchy

Usage

```
## S3 method for class 'GatingHierarchy'
range(..., na.rm = FALSE, type = c("instrument", "data"), raw.scale = FALSE)
```

Arguments

...	GatingHierarchy object
na.rm	not used
type	character of "instrument" or "data" indicating whether to retrieve the instrument or the actual data range
raw.scale	logical whether convert the range from transformed scale to raw scale

Value

matrix

Examples

```
## Not run:
 range(gh, type = "data")#return data range
 range(gh) #return instrument range
 range(gh, raw.scale = TRUE) #inverse transform the range to the raw scale

## End(Not run)
```

read.gatingML.cytobank *Parser for gatingML exported by Cytobank*

Description

The Default parser (read.gatingML) does not parse the population tree as well as the custom information from cytobank. (e.g. gate name, fcs filename).

Usage

```
read.gatingML.cytobank(file, ...)
```

Arguments

file	Gating-ML XML file
...	additional arguments passed to the handlers of 'xmlTreeParse'

Value

a graphGML that represents the population tree. The gate and population name are stored in nodeData of each node. Compensation and transformations are stored in graphData.

Examples

```
## Not run:
g <- read.gatingML.cytobank(xml) #parse the population tree
#plot(g) #visualize it

## End(Not run)
```

show,graphGML-method *show method for graphGML*

Description

show method for graphGML

Usage

```
## S4 method for signature 'graphGML'
show(object)
```

Arguments

object	graphGML

Value

nothing

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