GenEx

Software library for object detection in genetical analysis evaluation

Softwarová knihovna pro vyhledávání objektů při vyhodnocování genetických analýz

Application Programming Interface

J. Schier, B. Kovář, M. Kuneš

Institute of Information Theory and Automation of the AS CR

schier@utia.cas.cz

Supported from the TA01010931 project of the Technology Agency of the Czech Republic

Contents

Chapter 1

Namespace Index

1.1 Packages

Here are the packages with brief descriptions (if available):

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

Namespace Documentation

5.1 Package genex

Packages

- package lib

Classes

- class DapiProcessor
- class GenexIterator
- class GenexPipeline
- class SignalProcessor

5.1.1 Detailed Description

5.2 Package genex.lib

Packages

- package filter
- package i18n
- package imagereader
- package output
- package params
- package thresholder

Classes

- class Channel

  Single channel representation.
- class ChannelStringMap
- class Dapi
- class ExtRoi
- class GenExDefines
- class GraphicsUtils
- class ObjectFilter
- class RoiLabeler
- class Segmenation
- class SigChannel

  Channel-specific methods for hybridization signals, extends the Channel class.
- class SignalRoi
- class SignalStats
- class Util

5.2.1 Detailed Description

5.3 Package genex.lib.filter

Classes

- interface AbstractFilterFactory
- class AreaCircFilter
- class AreaCircFilterFactory
- interface Filter

5.4 Package genex.lib.i18n

Classes

- class GenExBundle
- class GenExBundle_cs_CZ
- class GenExBundle_en_US

5.5 Package genex.lib.imagereader

Classes

- class FileImgReader
- interface ImageReader
- class RGButils
- class ScreenImgReader

5.6 Package genex.lib.output

Classes

- class FISHdata
- class Results

5.6.1 Detailed Description

5.7 Package genex.lib.params

Classes

- class ChannelInfo
- class ImageDirInfo
- class InputGuiMain
- class InputGuiUtils
- class ParamDefines

5.7.1 Detailed Description

5.8 Package genex.lib.thresholder

Classes

- interface AbstractThresholderFactory
- class CSVWriter

- class IJAutoThresholder
- class IJAutoThresholderFactory
- class SnellThresholder

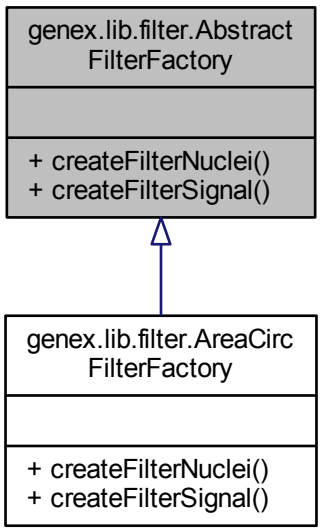
  Implementation of Violet Snell segmentation.
- class SnellThresholderFactory
- interface Thresholder

Chapter 6

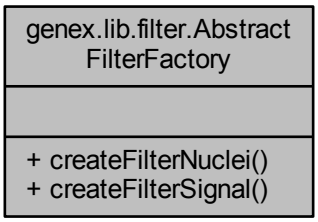
Class Documentation

6.1 genex.lib.filter.AbstractFilterFactory Interface Reference

Inheritance diagram for genex.lib.filter.AbstractFilterFactory:



Collaboration diagram for genex.lib.filter.AbstractFilterFactory:



Public Member Functions

- Filter createFilterNuclei ()
- Filter createFilterSignal ()

6.1.1 Member Function Documentation

6.1.1.1 Filter genex.lib.filter.AbstractFilterFactory.createFilterNuclei ( )

Implemented in genex.lib.filter.AreaCircFilterFactory.

6.1.1.2 Filter genex.lib.filter.AbstractFilterFactory.createFilterSignal ( )

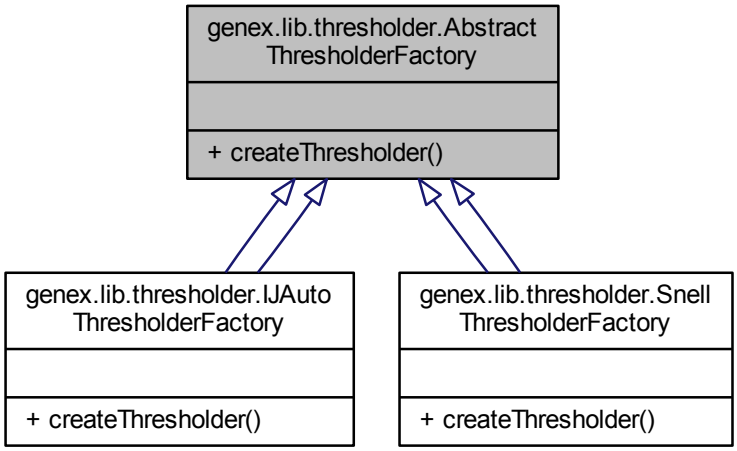
Implemented in genex.lib.filter.AreaCircFilterFactory.

The documentation for this interface was generated from the following file:

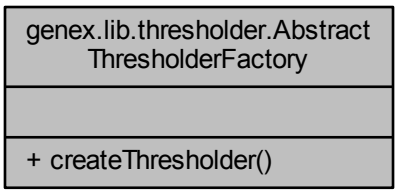
- src/genex/lib/filter/AbstractFilterFactory.java

6.2 genex.lib.thresholder.AbstractThresholderFactory Interface Reference

Inheritance diagram for genex.lib.thresholder.AbstractThresholderFactory:



Collaboration diagram for genex.lib.thresholder.AbstractThresholderFactory:



Public Member Functions

- Thresholder createThresholder ()

6.2.1 Detailed Description

Abstract factory for the thresholder methods.

Author

J. Schier

6.2.2 Member Function Documentation

6.2.2.1 Thresholder genex.lib.thresholder.AbstractThresholderFactory.createThresholder ( )

Create thresholder instance

Returns

Thresholder

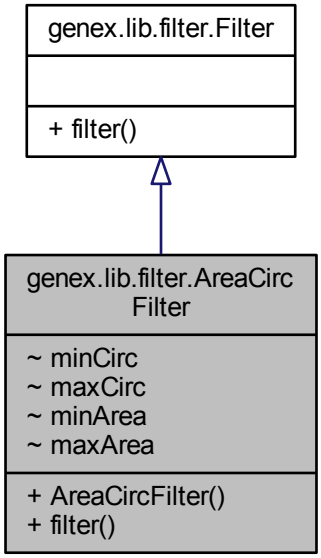
Implemented in genex.lib.thresholder.IJAutoThresholderFactory, and genex.lib.thresholder.SnellThresholder↩ Factory.

The documentation for this interface was generated from the following file:

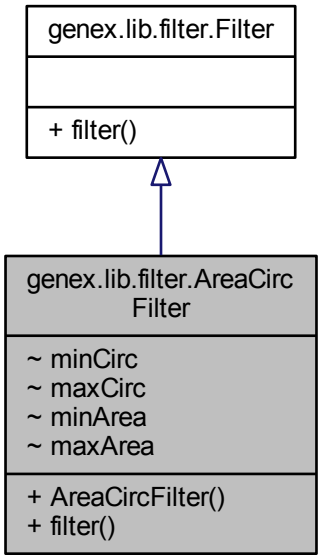
- src/genex/lib/thresholder/AbstractThresholderFactory.java

6.3 genex.lib.filter.AreaCircFilter Class Reference

Inheritance diagram for genex.lib.filter.AreaCircFilter:



Collaboration diagram for genex.lib.filter.AreaCircFilter:



Public Member Functions

- AreaCircFilter (int minArea, int maxArea, double minCirc, double maxCirc)
- void filter (ArrayList< ExtRoi > rois, ResultsTable results)

Package Attributes

- final double minCirc
- final double maxCirc
- final int minArea
- final int maxArea

6.3.1 Constructor & Destructor Documentation

6.3.1.1 genex.lib.filter.AreaCircFilter.AreaCircFilter (int *minArea,* int *maxArea,* double *minCirc,* double *maxCirc*)

6.3.2 Member Function Documentation

6.3.2.1 void genex.lib.filter.AreaCircFilter.filter (ArrayList< **ExtRoi** > *rois,* ResultsTable *results*)

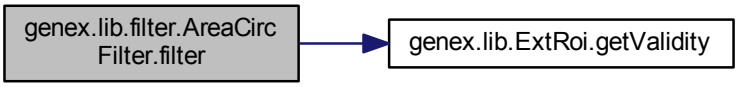
Filter list of ExtRoi by area and circularity, as set by class constructor. The result (boolean valid{invalid) is, for each particle, stored into the corresponding ExtRoi parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. ExtRoi class is used.

Parameters

results	results table
extRoi	input roi (see (ExtRoi)

Implements genex.lib.filter.Filter.

Here is the call graph for this function:



6.3.3 Member Data Documentation

6.3.3.1 final int genex.lib.filter.AreaCircFilter.maxArea [package]

6.3.3.2 final double genex.lib.filter.AreaCircFilter.maxCirc [package]

6.3.3.3 final int genex.lib.filter.AreaCircFilter.minArea [package]

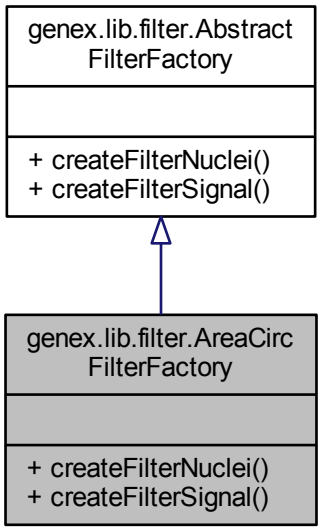
6.3.3.4 final double genex.lib.filter.AreaCircFilter.minCirc [package]

The documentation for this class was generated from the following file:

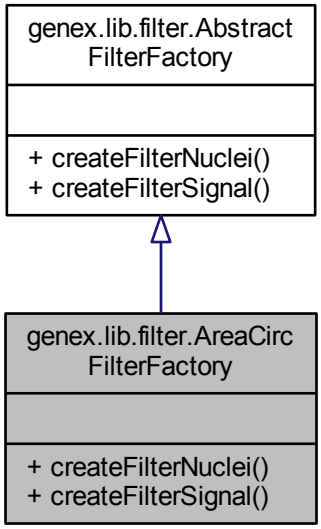
- src/genex/lib/filter/AreaCircFilter.java

6.4 genex.lib.filter.AreaCircFilterFactory Class Reference

Inheritance diagram for genex.lib.filter.AreaCircFilterFactory:



Collaboration diagram for genex.lib.filter.AreaCircFilterFactory:



Public Member Functions

- Filter createFilterNuclei ()
- Filter createFilterSignal ()

6.4.1 Member Function Documentation

6.4.1.1 Filter genex.lib.filter.AreaCircFilterFactory.createFilterNuclei ( )

Implements genex.lib.filter.AbstractFilterFactory.

6.4.1.2 Filter genex.lib.filter.AreaCircFilterFactory.createFilterSignal ( )

Implements genex.lib.filter.AbstractFilterFactory.

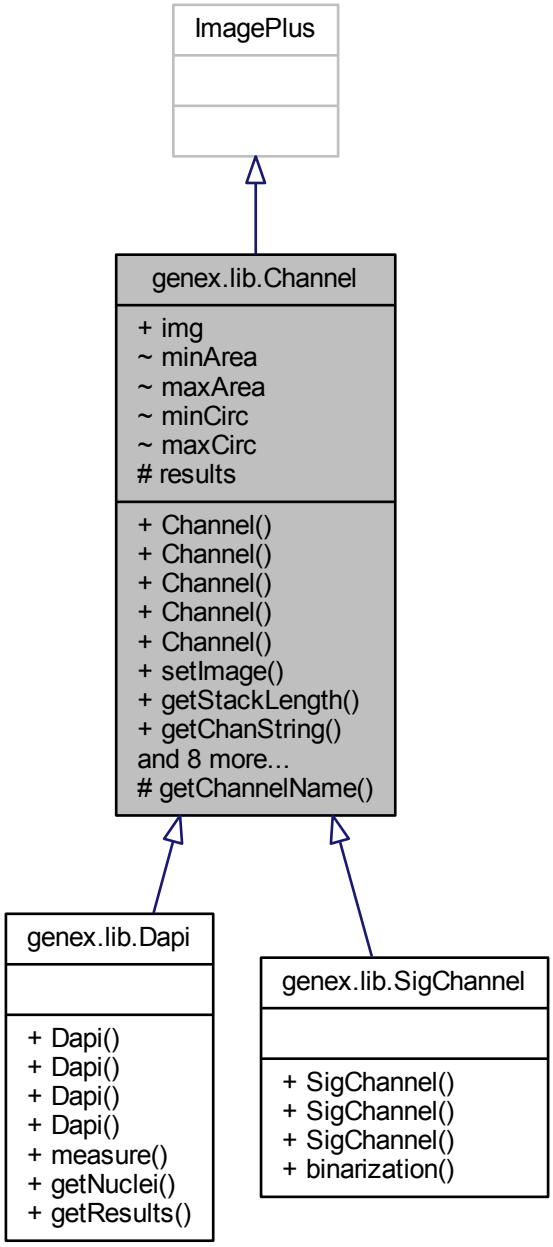
The documentation for this class was generated from the following file:

- src/genex/lib/filter/AreaCircFilterFactory.java

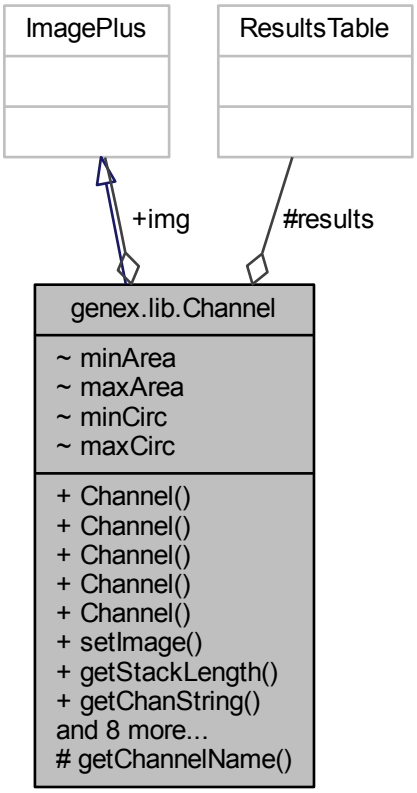
6.5 genex.lib.Channel Class Reference

Single channel representation.

Inheritance diagram for genex.lib.Channel:



Collaboration diagram for genex.lib.Channel:



Public Member Functions

- Channel (ImageStack[] stack, String channelName)
- Channel (ImageStack[] stack, GenExDefines.ChannelNames channel)
- Channel (ImagePlus image, String name)
- Channel (String name)
- Channel (ImagePlus img, ChannelNames channel)
- void setImage (final ImagePlus img)
- int getStackLength ()
- String getChanString (ChannelNames channel)
- String getChanString ()
- ImagePlus denoise (final Filters filtGaussian)
- void normalizeIntensity (final int maxIntensity)
- void preprocessing (final Filters filtMedian, final boolean despeckle, final int radiusBackground)
- void showBinary ()
- ArrayList< ExtRoi > analyzeParticles (final int measurements, final int minArea, final int maxArea, final double minCirc, final double maxCirc)
- ImagePlus getBinImg ()
- void setBinImg (ImagePlus binImg)

Public Attributes

- ImagePlus img

Protected Member Functions

- ChannelNames getChannelName ()

Protected Attributes

- ResultsTable results = new ResultsTable()

Package Attributes

- int minArea
- int maxArea
- double minCirc
- double maxCirc

6.5.1 Detailed Description

Single channel representation.

methods for selection of a channel from the input RGB image. preprocessing methods, background correction

6.5.2 Constructor & Destructor Documentation

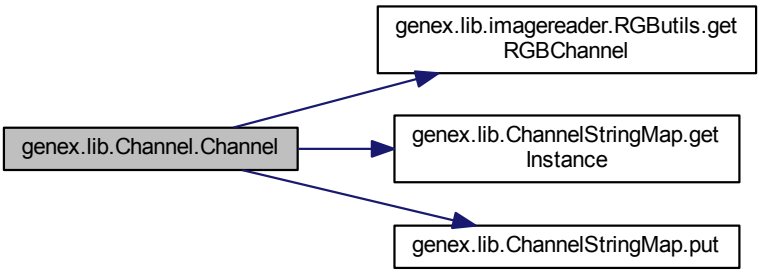
6.5.2.1 genex.lib.Channel.Channel (ImageStack[] *stack*, String *channelName*)

Selects channel from the input RGB stack.

Parameters

stack	input stack of RGB images (from microscope)
channelName	"RED"/"GREEN"/"BLUE" color of the selected channel

Here is the call graph for this function:



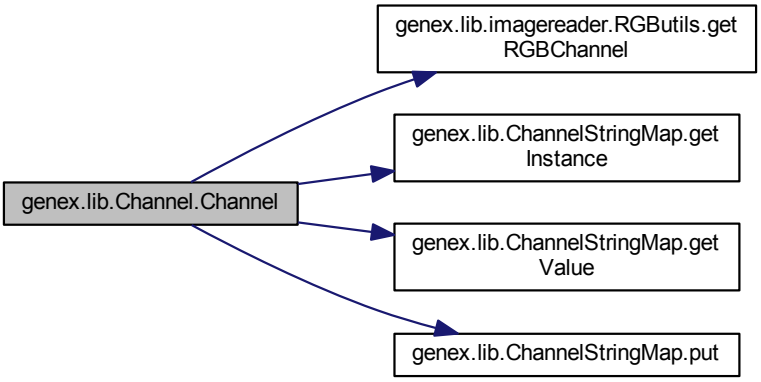
6.5.2.2 genex.lib.Channel.Channel (ImageStack[] *stack,* GenExDefines.ChannelNames *channel*)

Selects channel from the input RGB stack.

Parameters

stack	input stack of RGB images (from microscope)
channel	RED/GREEN/DAPI selected channel GenExDefines.ChannelNames

Here is the call graph for this function:



6.5.2.3 genex.lib.Channel.Channel (ImagePlus *image*, String *name*)

Constructs the Channel object from a single input image.

Parameters

image	input image
name	channel name

6.5.2.4 genex.lib.Channel.Channel (String *name*)

Assign name to the Channel object

Parameters

name	channel name

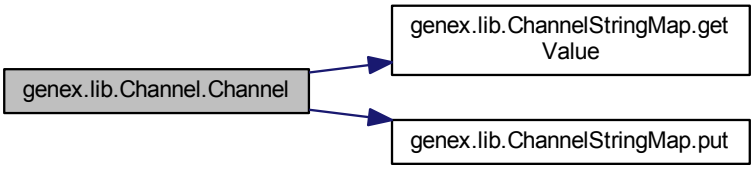
6.5.2.5 genex.lib.Channel.Channel (ImagePlus *img*, ChannelNames *channel*)

Constructs the Channel object using the input image and channel identifier

Parameters

img	input image
channel	channel identifier GenExDefines.ChannelNames

Here is the call graph for this function:



6.5.3 Member Function Documentation

6.5.3.1 ArrayList<ExtRoi> genex.lib.Channel.analyzeParticles (final int *measurements*, final int *minArea*, final int *maxArea*, final double *minCirc*, final double *maxCirc*)

ImageJ Particle analysis

Parameters

measurements	measurements to be performed, as defined by http://imagej.nih.↩ gov/ij/developer/api/ij/measure/Measurements.html
minArea	minimum area of particles
maxArea	maximum area of particles
minCirc	minimum circularity of particles
maxCirc	maximum circularity of particles

Returns

6.5.3.2 ImagePlus genex.lib.Channel.denoise (final Filters *filtGaussian*)

Implements selection of single channel from the RGB input stack.

Parameters

stack	input stack of RGB images
channelName	channel selector ("RED"/"GREEN"/"DAPI"|"BLUE")

Returns

selected channel (ImagePlus) or null if the selector is not valid Implements selection of single channel from the RGB input stack.

Parameters

stack	input stack of RGB images
channelName	channel selector ("RED"/"GREEN"/"DAPI"|"BLUE")

Returns

selected channel (ImagePlus) or null if the selector is not valid Noise supression by deconvolution with a Gaussian kernel or median filter.

Parameters

filtGaussian	defined in GenExDefines

Returns

denoised image

6.5.3.3 ImagePlus genex.lib.Channel.getBinImg ( )

Returns

binary image

6.5.3.4 ChannelNames genex.lib.Channel.getChannelName ( ) [protected]

Returns

channel descriptor as defined by GenExDefines.ChannelNames

6.5.3.5 String genex.lib.Channel.getChanString (ChannelNames *channel*)

Convert channel descriptor as defined by GenExDefines.ChannelNames to channel name (String) "DAPI"/"GRE↩EN"/"RED"

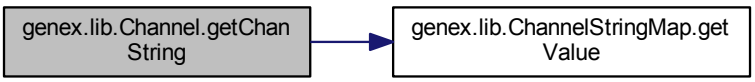
Parameters

channel	channel descriptor

Returns

channel name

Here is the call graph for this function:

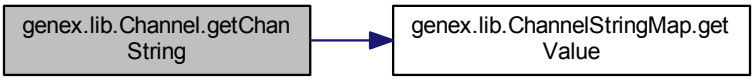


6.5.3.6 String genex.lib.Channel.getChanString ( )

Returns

channel name (String) "DAPI"/"GREEN"/"RED"

Here is the call graph for this function:



6.5.3.7 int genex.lib.Channel.getStackLength ( )

Returns

number of images to process before saving results Set number of images to process before saving results

Parameters

nImages	

Returns

stack length - number of images to process

6.5.3.8 void genex.lib.Channel.normalizeIntensity (final int *maxIntensity*)

Non-linear intensity normalization. Estimates background threshold as image mean + 3∗std and foreground threshold as mean + 7∗std. If the image max intensity is between foreground threshold and maxIntensity parameter, everything above background threshold is scaled so that the max intensity reaches the maxIntensity value.

Parameters

maxIntensity	maximum required intesity

6.5.3.9 void genex.lib.Channel.preprocessing (final **Filters** *filtMedian,* final boolean *despeckle,* final int *radiusBackground*)

Preprocessing: median filter, background correction with rolling ball filter

Parameters

filtMedian	filter type for denoising FILT_MEDIAN, FILT_GAUSSIAN, FILT_NONE
despeckle	use median filter with small radius (1.0) to despeckle
radius↩ Background	filter radius for rolling ball background correction

6.5.3.10 void genex.lib.Channel.setBinImg (ImagePlus *binImg*)

Assign binary image to the channel

Parameters

binImg	

6.5.3.11 void genex.lib.Channel.setImage (final ImagePlus *img*)

6.5.3.12 void genex.lib.Channel.showBinary ( )

Display binary image

6.5.4 Member Data Documentation

6.5.4.1 ImagePlus genex.lib.Channel.img

6.5.4.2 int genex.lib.Channel.maxArea [package]

6.5.4.3 double genex.lib.Channel.maxCirc [package]

6.5.4.4 int genex.lib.Channel.minArea [package]

6.5.4.5 double genex.lib.Channel.minCirc [package]

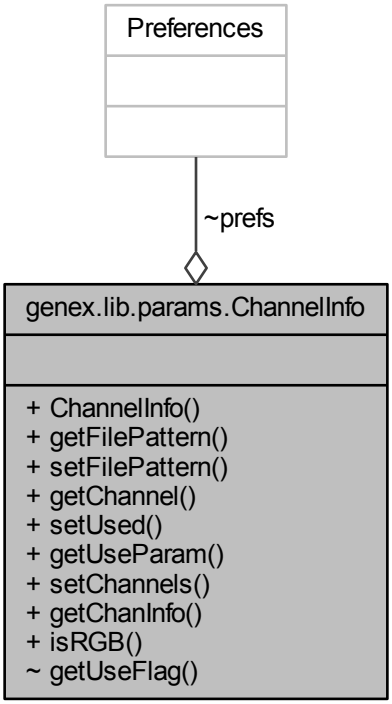
6.5.4.6 ResultsTable genex.lib.Channel.results = new ResultsTable() [protected]

The documentation for this class was generated from the following file:

- src/genex/lib/Channel.java

6.6 genex.lib.params.ChannelInfo Class Reference

Collaboration diagram for genex.lib.params.ChannelInfo:



Public Member Functions

- ChannelInfo (ChannelNames channel)
- String getFilePattern ()
- void setFilePattern (String filePattern)
- ChannelNames getChannel ()
- void setUsed (Boolean used)
- void getUseParam ()
- void setChannels (ArrayList< ChannelInfo > channelInfo)
- ArrayList< ChannelInfo > getChanInfo ()
- Boolean isRGB ()

Package Functions

- Boolean getUseFlag ()

Package Attributes

- final Preferences prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)

6.6.1 Detailed Description

Class for storing information about channel parameters (channel usage, filename pattern, channel Id)

Author

J. Schier, B. Kovář

6.6.2 Constructor & Destructor Documentation

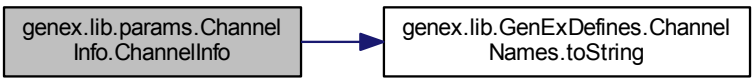
6.6.2.1 genex.lib.params.ChannelInfo.ChannelInfo (ChannelNames *channel*)

Constructor

Parameters

channel	channel identifier (see genex.lib.GenExDefines.ChannelNames)

Here is the call graph for this function:



6.6.3 Member Function Documentation

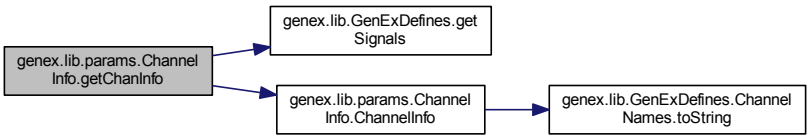
6.6.3.1 ArrayList<ChannelInfo> genex.lib.params.ChannelInfo.getChanInfo ( )

Read information about channels from Preferences, populate ChannelInfo records

Returns

list of ChannelInfo records

Here is the call graph for this function:



6.6.3.2 ChannelNames genex.lib.params.ChannelInfo.getChannel ( )

Get channel identifier

Returns

identifier (see genex.lib.GenExDefines.ChannelNames)

6.6.3.3 String genex.lib.params.ChannelInfo.getFilePattern ( )

Returns

the file pattern of images belonging to channel

6.6.3.4 Boolean genex.lib.params.ChannelInfo.getUseFlag ( ) [package]

Get the channel use flag

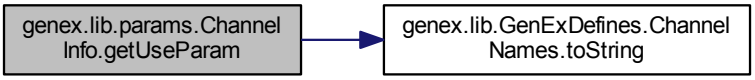
Returns

used

6.6.3.5 void genex.lib.params.ChannelInfo.getUseParam ( )

Read use flag for the given ChannelInfo record from the Preferences

Here is the call graph for this function:



6.6.3.6 Boolean genex.lib.params.ChannelInfo.isRGB ( )

6.6.3.7 void genex.lib.params.ChannelInfo.setChannels (ArrayList< ChannelInfo > *channelInfo*)

Set local channelInfo list to the list in parameter

Parameters

channelInfo	list of channel information records

6.6.3.8 void genex.lib.params.ChannelInfo.setFilePattern (String *filePattern*)

Set file pattern for images belonging to the channel

Parameters

filePattern	the file pattern to set

6.6.3.9 void genex.lib.params.ChannelInfo.setUsed (Boolean *used*)

Set the channel use flag

Parameters

used	the flag value

6.6.4 Member Data Documentation

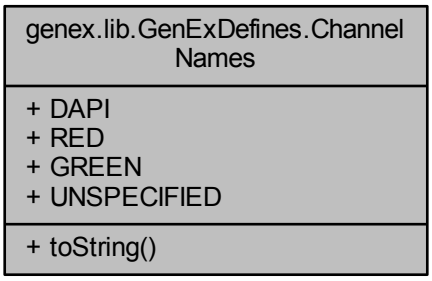
6.6.4.1 final Preferences genex.lib.params.ChannelInfo.prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT) [package]

The documentation for this class was generated from the following file:

- src/genex/lib/params/ChannelInfo.java

6.7 genex.lib.GenExDefines.ChannelNames Enum Reference

Collaboration diagram for genex.lib.GenExDefines.ChannelNames:



Public Member Functions

- String toString ()

Public Attributes

- DAPI =("DAPI")
- RED =("RED")
- GREEN =("GREEN")
- UNSPECIFIED =("")

6.7.1 Detailed Description

Definition of channel identifiers

Author

J. Schier

6.7.2 Member Function Documentation

6.7.2.1 String genex.lib.GenExDefines.ChannelNames.toString ( )

6.7.3 Member Data Documentation

6.7.3.1 genex.lib.GenExDefines.ChannelNames.DAPI =("DAPI")

6.7.3.2 genex.lib.GenExDefines.ChannelNames.GREEN =("GREEN")

6.7.3.3 genex.lib.GenExDefines.ChannelNames.RED =("RED")

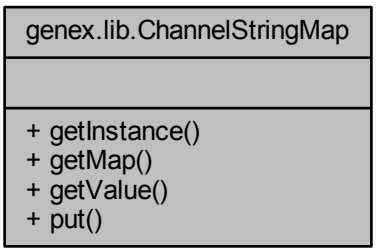
6.7.3.4 genex.lib.GenExDefines.ChannelNames.UNSPECIFIED =("")

The documentation for this enum was generated from the following file:

- src/genex/lib/GenExDefines.java

6.8 genex.lib.ChannelStringMap Class Reference

Collaboration diagram for genex.lib.ChannelStringMap:



Static Public Member Functions

- static ChannelStringMap getInstance ()
- static HashMap< ChannelNames, String > getMap ()
- static String getValue (ChannelNames key)
- static void put (ChannelNames chanName, String chanString)

6.8.1 Detailed Description

Helper class for conversion between ChannelName ID and channel String descriptor

Author

schier

6.8.2 Member Function Documentation

6.8.2.1 static ChannelStringMap genex.lib.ChannelStringMap.getInstance ( ) [static]

6.8.2.2 static HashMap<ChannelNames, String> genex.lib.ChannelStringMap.getMap ( ) [static]

6.8.2.3 static String genex.lib.ChannelStringMap.getValue (ChannelNames *key*) [static]

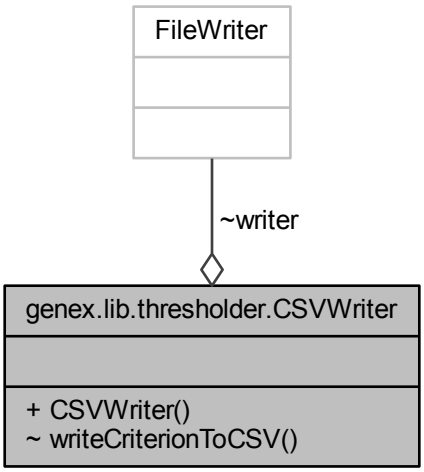
6.8.2.4 static void genex.lib.ChannelStringMap.put (ChannelNames *chanName*, String *chanString*) [static]

The documentation for this class was generated from the following file:

- src/genex/lib/ChannelStringMap.java

6.9 genex.lib.thresholder.CSVWriter Class Reference

Collaboration diagram for genex.lib.thresholder.CSVWriter:



Public Member Functions

- CSVWriter (String dir, String filename, String descriptor) throws Exception

Package Functions

- void writeCriterionToCSV (Map< Integer, Double > criterion) throws Exception

Package Attributes

- FileWriter writer

6.9.1 Constructor & Destructor Documentation

6.9.1.1 genex.lib.thresholder.CSVWriter.CSVWriter (String *dir,* String *filename,* String *descriptor*) throws Exception

6.9.2 Member Function Documentation

6.9.2.1 void genex.lib.thresholder.CSVWriter.writeCriterionToCSV (Map< Integer, Double > *criterion*) throws Exception [package]

6.9.3 Member Data Documentation

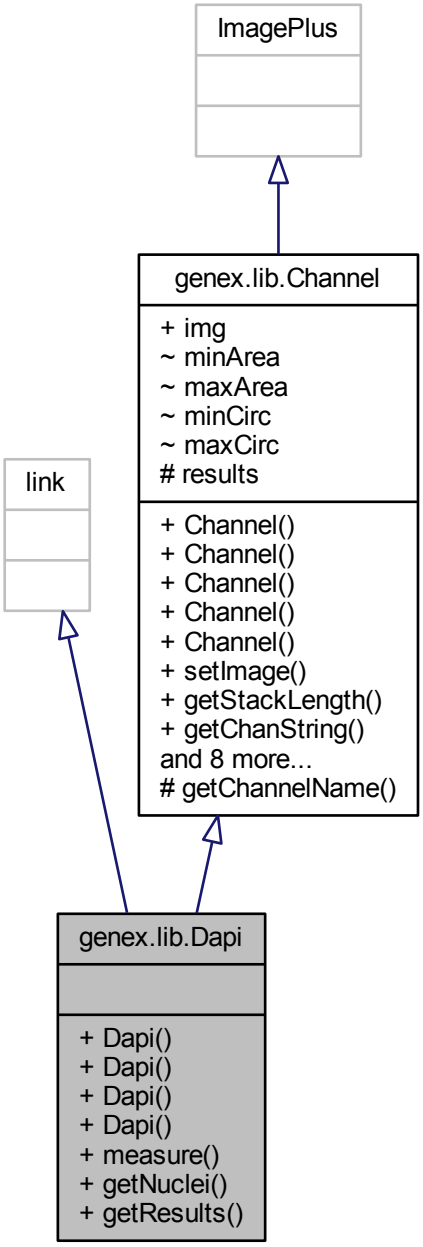
6.9.3.1 FileWriter genex.lib.thresholder.CSVWriter.writer [package]

The documentation for this class was generated from the following file:

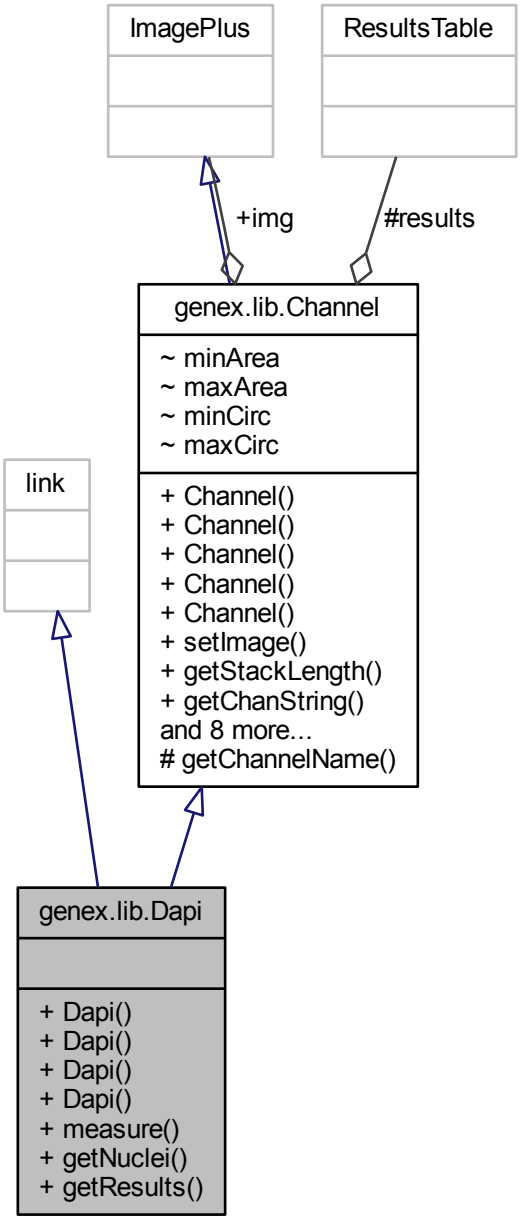
- src/genex/lib/thresholder/CSVWriter.java

6.10 genex.lib.Dapi Class Reference

Inheritance diagram for genex.lib.Dapi:



Collaboration diagram for genex.lib.Dapi:



Public Member Functions

- Dapi (ImageStack[] stack, String channelName)
- Dapi (ImageStack[] stack, ChannelNames channel)
- Dapi (ImagePlus img)
- Dapi ()
- ResultsTable measure (final int measurements, final int minArea, final int maxArea, final double minCirc, final double maxCirc)
- ArrayList< ExtRoi > getNuclei ()

- ResultsTable getResults ()

Additional Inherited Members

6.10.1 Detailed Description

Class for representation and processing of the DAPI channel genex.lib.Channel}

Author

J. Schier

6.10.2 Constructor & Destructor Documentation

6.10.2.1 genex.lib.Dapi.Dapi (ImageStack[] *stack*, String *channelName*)

Class constructor

Parameters

stack	input RGB image stack
channelName	channel to be extracted

6.10.2.2 genex.lib.Dapi.Dapi (ImageStack[] *stack*, ChannelNames *channel*)

Class constructor

Parameters

stack	input RGB image stack
channel	channel to be extracted GenExDefines.ChannelNames

6.10.2.3 genex.lib.Dapi.Dapi (ImagePlus *img*)

Class constructor

Parameters

img	single channel input stack, pointed by ImagePlus

6.10.2.4 genex.lib.Dapi.Dapi ( )

6.10.3 Member Function Documentation

6.10.3.1 ArrayList<ExtRoi> genex.lib.Dapi.getNuclei ( )

Returns

list of nuclei (ExtRoi genex.lib.ExtRoi) contained in the DAPI channel

6.10.3.2 ResultsTable genex.lib.Dapi.getResults ( )

Returns

ResultTable DAPI results table (see http://imagej.nih.gov/ij/developer/api/ij/measure/↩ ResultsTable.html})

6.10.3.3 ResultsTable genex.lib.Dapi.measure (final int *measurements,* final int *minArea,* final int *maxArea,* final double *minCirc,* final double *maxCirc*)

Analyze and measure the particles contained in the image

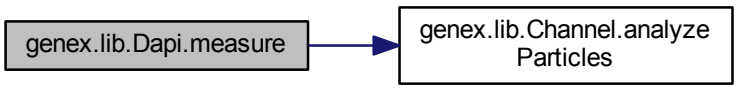
Parameters

measurements	the parameters to be measured
minArea	minimum area of the particles
maxArea	maximum area of the particles
minCirc	minimum circularity of the particles
maxCirc	minimum circularity of the particles

Returns

ImageJ result table (see http://imagej.nih.gov/ij/developer/api/ij/measure/↩ ResultsTable.html})

Here is the call graph for this function:

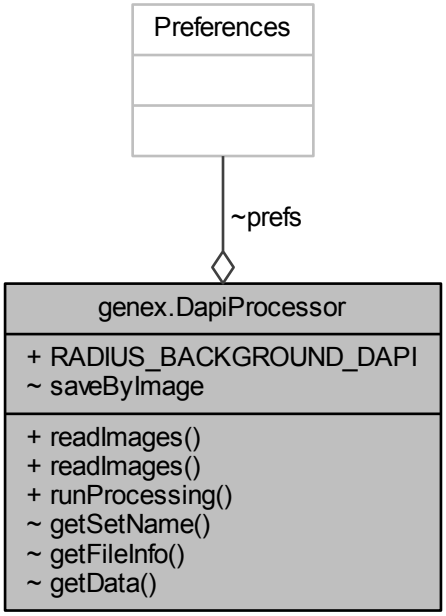


The documentation for this class was generated from the following file:

- src/genex/lib/Dapi.java

6.11 genex.DapiProcessor Class Reference

Collaboration diagram for genex.DapiProcessor:



Public Member Functions

- int readImages ()
- int readImages (String fname)
- Dapi runProcessing (final int measures, final boolean saveResults, final boolean exportRoi)

Public Attributes

- final int RADIUS_BACKGROUND_DAPI = 50

Package Functions

- String getSetName ()
- FileInfo getFileInfo ()
- FISHdata getData ()

Package Attributes

- final Preferences prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)
- boolean saveByImage = prefs.getBoolean(ParamDefines.PROCESS_BY_IMAGE, true)

6.11.1 Detailed Description

Author

schier

6.11.2 Member Function Documentation

6.11.2.1 FISHdata genex.DapiProcessor.getData ( ) [package]

6.11.2.2 FileInfo genex.DapiProcessor.getFileInfo ( ) [package]

Returns

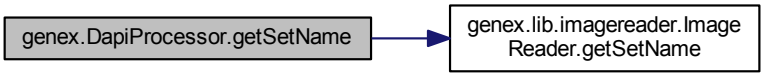
file information about the input set

6.11.2.3 String genex.DapiProcessor.getSetName ( ) [package]

Returns

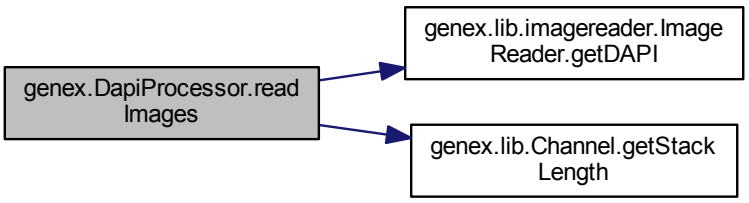
name of the input set

Here is the call graph for this function:



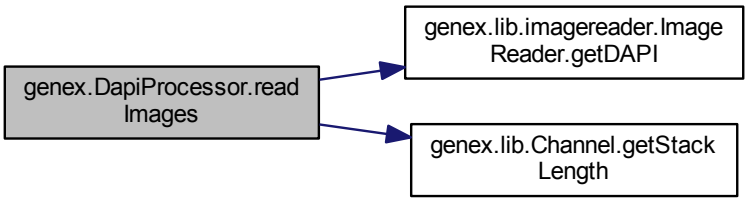
6.11.2.4 int genex.DapiProcessor.readImages ( )

Here is the call graph for this function:



6.11.2.5 int genex.DapiProcessor.readImages (String *fname*)

Here is the call graph for this function:



6.11.2.6 Dapi genex.DapiProcessor.runProcessing (final int *measures,* final boolean *saveResults,* final boolean *exportRoi*)

process the DAPI channel - includes background subtraction, intensity normalization, segmentation, particle measurement and filtering

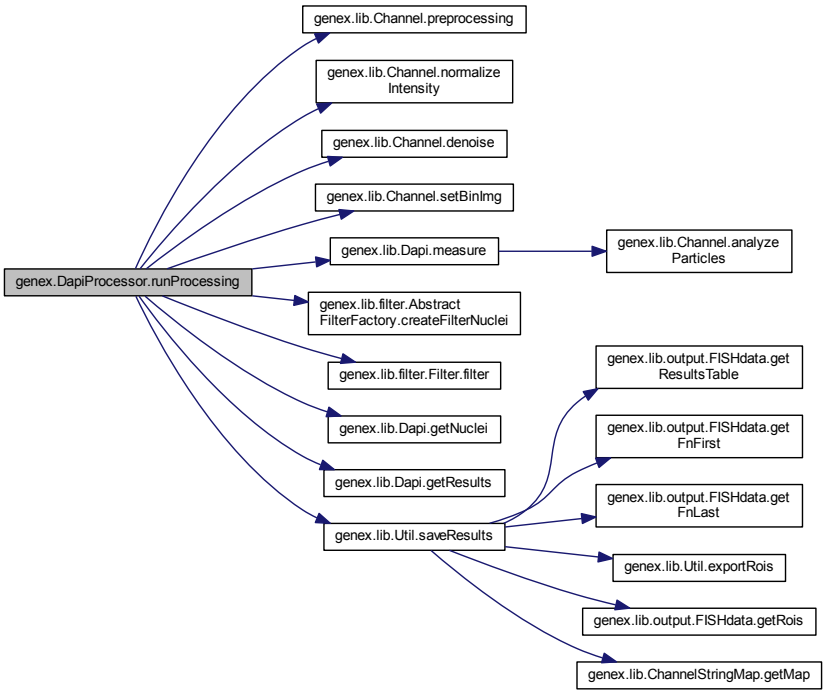
Parameters

measures	particle parameters to be measured
saveResults	boolean: save results to file
exportRoi	boolean: save Rois to file

Returns

Dapi object

Here is the call graph for this function:



6.11.3 Member Data Documentation

6.11.3.1 final Preferences genex.DapiProcessor.prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT) [package]

6.11.3.2 final int genex.DapiProcessor.RADIUS_BACKGROUND_DAPI = 50

Filter radius - DAPI background subtraction

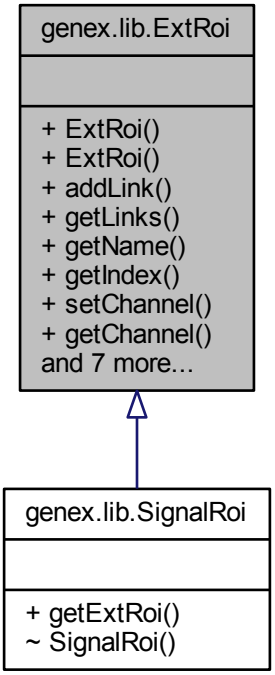
6.11.3.3 boolean genex.DapiProcessor.saveByImage = prefs.getBoolean(ParamDefines.PROCESS_BY_IMAGE, true) [package]

The documentation for this class was generated from the following file:

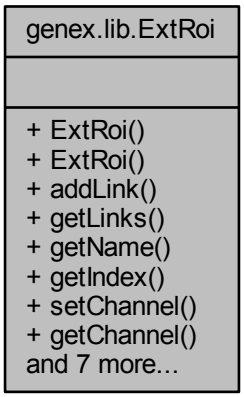
- src/genex/DapiProcessor.java

6.12 genex.lib.ExtRoi Class Reference

Inheritance diagram for genex.lib.ExtRoi:



Collaboration diagram for genex.lib.ExtRoi:



Public Member Functions

- ExtRoi (Roi roi, String fname, ChannelNames chanName, int idx)
- ExtRoi (Roi roi, String fname, boolean valid, ChannelNames chanName, int idx)
- void addLink (ExtRoi roi)
- ArrayList< ExtRoi > getLinks ()
- String getName ()
- int getIndex ()
- void setChannel (ChannelNames channel)
- ChannelNames getChannel ()
- void setRoi (Roi roi)
- Roi getRoi ()
- String getFname ()
- void setValidity (boolean valid)
- boolean getValidity ()
- void disable ()
- void enable ()

6.12.1 Detailed Description

Extended ROI, contains the Roi as defined by ImageJ (http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html) with added validity flag, channel name and link to parent (DAPI) or child (signal) object

Author

J. Schier

6.12.2 Constructor & Destructor Documentation

6.12.2.1 genex.lib.ExtRoi.ExtRoi (Roi *roi*, String *fname*, ChannelNames *chanName*, int *idx*)

Extended Roi constructor. Roi validity set to true.

Parameters

roi	ImageJ ROI (http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html)
fname	file name - image that contains this roi
chanName	channel identifier
idx	Index of this Roi. Must be unique in the given channel.

6.12.2.2 genex.lib.ExtRoi.ExtRoi (Roi *roi*, String *fname*, boolean *valid*, ChannelNames *chanName*, int *idx*)

Extended Roi constructor. Roi validity set to true.

Parameters

roi	ImageJ ROI (http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html)
fname	file name - image that contains this roi
valid	validity of this Roi
chanName	channel identifier
idx	Index of this Roi. Must be unique in the given channel.

6.12.3 Member Function Documentation

6.12.3.1 void genex.lib.ExtRoi.addLink (ExtRoi *roi*)

Add link to Roi in parameter Typically used to add link to a signal to the DAPI nucleus

Parameters

roi	Roi to be linked

6.12.3.2 void genex.lib.ExtRoi.disable ( )

Disable (set validity to false) this Roi and (if the Roi is in DAPI) the associated signals

6.12.3.3 void genex.lib.ExtRoi.enable ( )

Enable (set validity to true) this Roi

6.12.3.4 ChannelNames genex.lib.ExtRoi.getChannel ( )

Returns

channel identifier (see linkGenExDefines.ChannelNames)

6.12.3.5 String genex.lib.ExtRoi.getFname ( )

Returns

the name of the file that contains this roi

6.12.3.6 int genex.lib.ExtRoi.getIndex ( )

Returns

index of this Roi

6.12.3.7 ArrayList<ExtRoi> genex.lib.ExtRoi.getLinks ( )

Get the Rois linked to this Roi Typically used to get all signals associated with a nucleus

Returns

List of extended Rois

6.12.3.8 String genex.lib.ExtRoi.getName ( )

Returns

name of the associated ImageJ Roi

6.12.3.9 Roi genex.lib.ExtRoi.getRoi ( )

Returns

ImageJ Roi boundary associated with this Extended Roi

6.12.3.10 boolean genex.lib.ExtRoi.getValidity ( )

Returns

validity of this Roi

6.12.3.11 void genex.lib.ExtRoi.setChannel (ChannelNames *channel*)

Set the channel identifier (see linkGenExDefines.ChannelNames)@paramchannel

6.12.3.12 void genex.lib.ExtRoi.setRoi (Roi *roi*)

Set the ImageJ Roi boundary associated with this Extended Roi

Parameters

roi	

6.12.3.13 void genex.lib.ExtRoi.setValidity (boolean *valid*)

Set validity of this Roi

Parameters

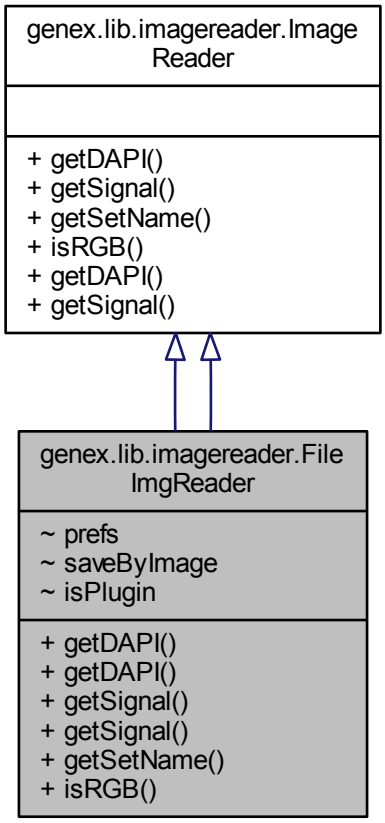
valid	

The documentation for this class was generated from the following file:

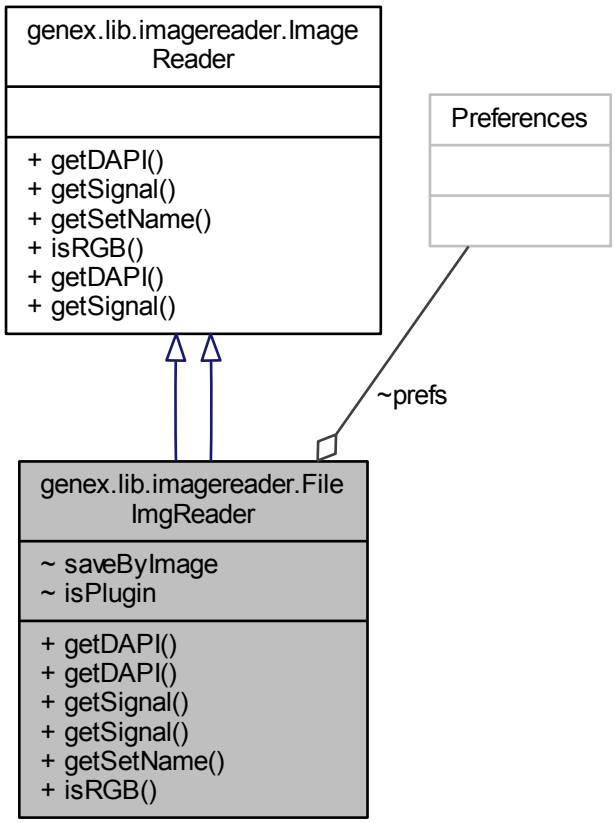
- src/genex/lib/ExtRoi.java

6.13 genex.lib.imagereader.FileImgReader Class Reference

Inheritance diagram for genex.lib.imagereader.FileImgReader:



Collaboration diagram for genex.lib.imagereader.FileImgReader:



Public Member Functions

- Dapi getDAPI ()
- Dapi getDAPI (String filename)
- SigChannel getSignal (ChannelNames channel)
- SigChannel getSignal (String filename, ChannelNames channel)
- String getSetName ()
- boolean isRGB ()

Package Attributes

- final Preferences prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)
- boolean saveByImage = prefs.getBoolean(ParamDefines.PROCESS_BY_IMAGE, true)
- boolean isPlugin = prefs.getBoolean(ParamDefines.IS_PLUGIN, true)

6.13.1 Detailed Description

Reads sequence of images from a disk directory to selected channel Images are identified by parameters stored in ChannelInfo object (directory, filename pattern, used/unused channel) These parameters are set using the GenExParams_ plugin and saved using java.util.prefs.Preferences

Author

Bohumil Kovar, Jan Schier

6.13.2 Member Function Documentation

6.13.2.1 Dapi genex.lib.imagereader.FileImgReader.getDAPI ( )

Get the DAPI channel

Returns

object containing the DAPI image

Implements genex.lib.imagereader.ImageReader.

6.13.2.2 Dapi genex.lib.imagereader.FileImgReader.getDAPI (String *filename*)

Get the DAPI channel Returns null if the filename is not found

Parameters

filename	name of image to read

Returns

object containing the DAPI image

Implements genex.lib.imagereader.ImageReader.

6.13.2.3 String genex.lib.imagereader.FileImgReader.getSetName ( )

Get the name of the image set

Returns

set name

Implements genex.lib.imagereader.ImageReader.

6.13.2.4 SigChannel genex.lib.imagereader.FileImgReader.getSignal (ChannelNames *channel*)

Get single signal channel

Parameters

channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implements genex.lib.imagereader.ImageReader.

6.13.2.5 SigChannel genex.lib.imagereader.FileImgReader.getSignal (String *filename,* ChannelNames *channel*)

Get single signal channel Returns null if the filename is not found

Parameters

filename	name of image to read
channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implements genex.lib.imagereader.ImageReader.

6.13.2.6 boolean genex.lib.imagereader.FileImgReader.isRGB ( )

Returns

true for RGB input images

Implements genex.lib.imagereader.ImageReader.

6.13.3 Member Data Documentation

6.13.3.1 boolean genex.lib.imagereader.FileImgReader.isPlugin = prefs.getBoolean(ParamDefines.IS_PLUGIN, true) [package]

6.13.3.2 final Preferences genex.lib.imagereader.FileImgReader.prefs = Preferences.userRoot().node(ParamDefines.PREF↩S_ROOT) [package]

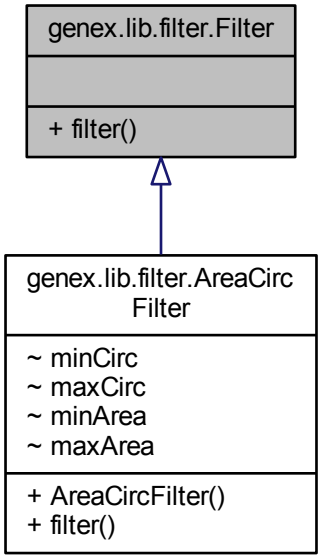
6.13.3.3 boolean genex.lib.imagereader.FileImgReader.saveByImage = prefs.getBoolean(ParamDefines.PROCESS_BY_I↩MAGE, true) [package]

The documentation for this class was generated from the following file:

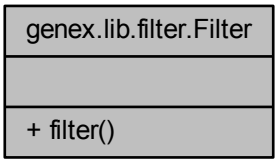
- src/genex/lib/imagereader/FileImgReader.java

6.14 genex.lib.filter.Filter Interface Reference

Inheritance diagram for genex.lib.filter.Filter:



Collaboration diagram for genex.lib.filter.Filter:



Public Member Functions

- void filter (ArrayList< ExtRoi > rois, ResultsTable results)

6.14.1 Member Function Documentation

6.14.1.1 void genex.lib.filter.Filter.filter (ArrayList< ExtRoi > *rois*, ResultsTable *results*)

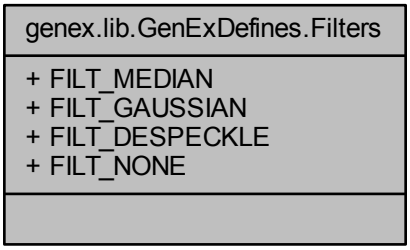
Implemented in genex.lib.filter.AreaCircFilter.

The documentation for this interface was generated from the following file:

- src/genex/lib/filter/Filter.java

6.15 genex.lib.GenExDefines.Filters Enum Reference

Collaboration diagram for genex.lib.GenExDefines.Filters:



Public Attributes

- FILT_MEDIAN
- FILT_GAUSSIAN
- FILT_DESPECKLE
- FILT_NONE

6.15.1 Detailed Description

Filter identifiers for channel denoising

Author

J. Schier

6.15.2 Member Data Documentation

6.15.2.1 genex.lib.GenExDefines.Filters.FILT_DESPECKLE

6.15.2.2 genex.lib.GenExDefines.Filters.FILT_GAUSSIAN

6.15.2.3 genex.lib.GenExDefines.Filters.FILT_MEDIAN

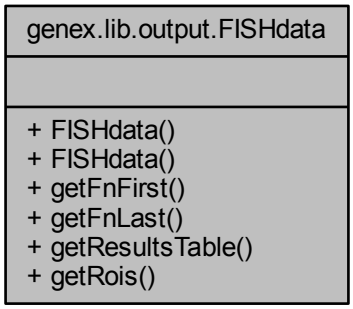
6.15.2.4 genex.lib.GenExDefines.Filters.FILT_NONE

The documentation for this enum was generated from the following file:

- src/genex/lib/GenExDefines.java

6.16 genex.lib.output.FISHdata Class Reference

Collaboration diagram for genex.lib.output.FISHdata:



Public Member Functions

- FISHdata (ResultsTable results, ArrayList< ExtRoi > rois)
- FISHdata (ResultsTable results, ArrayList< ExtRoi > rois, String fnFirst, String fnLast)
- String getFnFirst ()
- String getFnLast ()
- ResultsTable getResultsTable ()
- ArrayList< ExtRoi > getRois ()

6.16.1 Detailed Description

Helper class to store ResultTable and extended Rois for one channel together.

Author

J. Schier

6.16.2 Constructor & Destructor Documentation

6.16.2.1 genex.lib.output.FISHdata.FISHdata (ResultsTable *results*, ArrayList< ExtRoi > *rois*)

Constructor

Parameters

results	ResultsTable (see http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html)
rois	Extended Rois (see ExtRoi)

6.16.2.2 genex.lib.output.FISHdata.FISHdata (ResultsTable *results*, ArrayList< ExtRoi > *rois*, String *fnFirst*, String *fnLast*)

Constructor

Parameters

results	ResultsTable (see http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html)
rois	Extended Rois (see ExtRoi)
fnFirst	filename of the first image processed
fnLast	filename of the last image processed

6.16.3 Member Function Documentation

6.16.3.1 String genex.lib.output.FISHdata.getFnFirst ( )

6.16.3.2 String genex.lib.output.FISHdata.getFnLast ( )

6.16.3.3 ResultsTable genex.lib.output.FISHdata.getResultsTable ( )

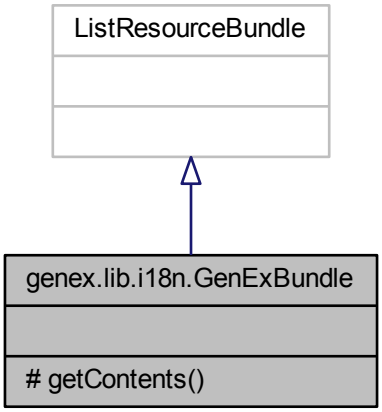
6.16.3.4 ArrayList<ExtRoi> genex.lib.output.FISHdata.getRois ( )

The documentation for this class was generated from the following file:

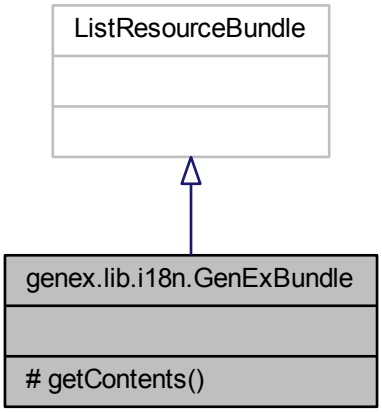
- src/genex/lib/output/FISHdata.java

6.17 genex.lib.i18n.GenExBundle Class Reference

Inheritance diagram for genex.lib.i18n.GenExBundle:



Collaboration diagram for genex.lib.i18n.GenExBundle:



Protected Member Functions

- Object[][] getContents ()

6.17.1 Detailed Description

Author

schier

6.17.2 Member Function Documentation

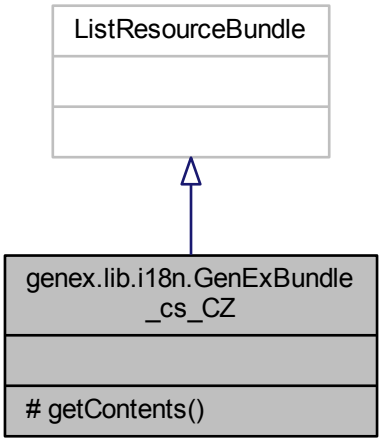
6.17.2.1 Object [][] genex.lib.i18n.GenExBundle.getContents ( ) [protected]

The documentation for this class was generated from the following file:

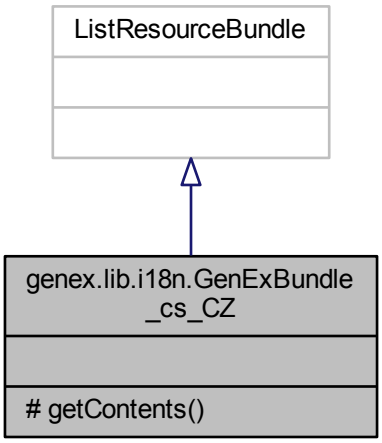
- src/genex/lib/i18n/GenExBundle.java

6.18 genex.lib.i18n.GenExBundle_cs_CZ Class Reference

Inheritance diagram for genex.lib.i18n.GenExBundle_cs_CZ:



Collaboration diagram for genex.lib.i18n.GenExBundle_cs_CZ:



Protected Member Functions

- Object[][] getContents ()

6.18.1 Detailed Description

Author

schier

6.18.2 Member Function Documentation

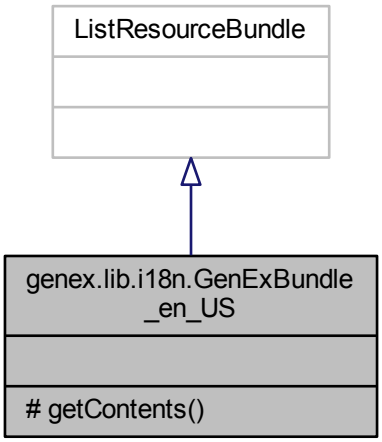
6.18.2.1 Object [][] genex.lib.i18n.GenExBundle_cs_CZ.getContents ( ) [protected]

The documentation for this class was generated from the following file:

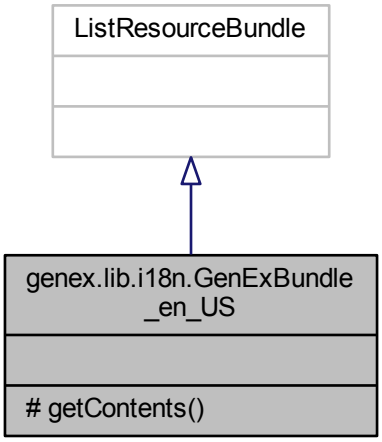
- src/genex/lib/i18n/GenExBundle_cs_CZ.java

6.19 genex.lib.i18n.GenExBundle_en_US Class Reference

Inheritance diagram for genex.lib.i18n.GenExBundle_en_US:



Collaboration diagram for genex.lib.i18n.GenExBundle_en_US:



Protected Member Functions

- Object[][] getContents ()

6.19.1 Detailed Description

Author

schier

6.19.2 Member Function Documentation

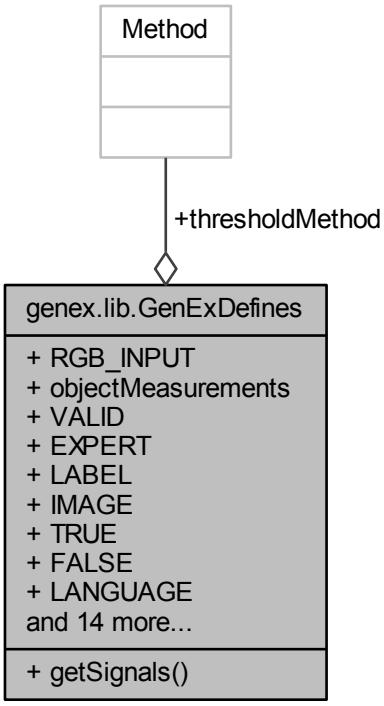
6.19.2.1 Object [][] genex.lib.i18n.GenExBundle_en_US.getContents ( ) [protected]

The documentation for this class was generated from the following file:

- src/genex/lib/i18n/GenExBundle_en_US.java

6.20 genex.lib.GenExDefines Class Reference

Collaboration diagram for genex.lib.GenExDefines:



Classes

- enum ChannelNames
- enum Filters

Public Member Functions

- ChannelNames[] getSignals ()

Public Attributes

- final String RGB_INPUT = "RGB_INPUT"

Static Public Attributes

- static Method thresholdMethod = AutoThresholder.Method.Otsu
- static int objectMeasurements
- static String VALID = "Valid"
- static String EXPERT = "Expert"
- static String LABEL = "Label"

- static String IMAGE = "Image"
- static String TRUE = "true"
- static String FALSE = "false"
- static String LANGUAGE = "cs"
- static String COUNTRY = "CZ"
- static String SELECT_DIR = "Select image directory"
- static String SELECT_CSV_DIR = "Select directory for results"
- static String ILLEGAL_CHAR = "Illegal character in the file pattern\nor empty pattern"
- static String ILLEGAL_CHAR_RGB = "Illegal character in the file pattern"
- static String INCORRECT_PATTERN = "Incorrect file pattern: "
- static String RGB_IMAGE = "RGB image"
- static String INPUT_PATTERN = "Input file pattern"
- static String SELECT_CHANNELS = "Select channels"
- static String FILE_PATTERNS = "File patterns"
- static String FILE_PATTERN = "Input file pattern"
- static String PATTERN = "Pattern"
- static String PATTERNS_FOR_CHANNELS = "Select file patterns\nfor channels"
- static String ERR_UNEQUAL_LENGTH = "Channels of unequal length"

6.20.1 Detailed Description

Helper class, constants and definitions used in the project

Author

J. Schier

6.20.2 Member Function Documentation

6.20.2.1 ChannelNames [] genex.lib.GenExDefines.getSignals ( )

Returns

names of fluorescence signals used in the library

6.20.3 Member Data Documentation

6.20.3.1 String genex.lib.GenExDefines.COUNTRY = "CZ" [static]

6.20.3.2 String genex.lib.GenExDefines.ERR_UNEQUAL_LENGTH = "Channels of unequal length" [static]

6.20.3.3 String genex.lib.GenExDefines.EXPERT = "Expert" [static]

6.20.3.4 String genex.lib.GenExDefines.FALSE = "false" [static]

6.20.3.5 String genex.lib.GenExDefines.FILE_PATTERN = "Input file pattern" [static]

6.20.3.6 String genex.lib.GenExDefines.FILE_PATTERNS = "File patterns" [static]

6.20.3.7 String genex.lib.GenExDefines.ILLEGAL_CHAR = "Illegal character in the file pattern\nor empty pattern" [static]

6.20.3.8 String genex.lib.GenExDefines.ILLEGAL_CHAR_RGB = "Illegal character in the file pattern" [static]

6.20.3.9 String genex.lib.GenExDefines.IMAGE = "Image" [static]

6.20.3.10 String genex.lib.GenExDefines.INCORRECT_PATTERN = "Incorrect file pattern: " [static]

6.20.3.11 String genex.lib.GenExDefines.INPUT_PATTERN = "Input file pattern" [static]

6.20.3.12 String genex.lib.GenExDefines.LABEL = "Label" [static]

6.20.3.13 String genex.lib.GenExDefines.LANGUAGE = "cs" [static]

6.20.3.14 int genex.lib.GenExDefines.objectMeasurements [static]

Initial value:

```
=
            ParticleAnalyzer.SLICE +
            ParticleAnalyzer.AREA +
            ParticleAnalyzer.CIRCULARITY +
            ParticleAnalyzer.PERIMETER +
            ParticleAnalyzer.MEAN +
            ParticleAnalyzer.CIRCULARITY +
            ParticleAnalyzer.RECT +
            ParticleAnalyzer.CENTER_OF_MASS +
            ParticleAnalyzer.SHAPE_DESCRIPTORS +
            ParticleAnalyzer.LABELS
```

6.20.3.15 String genex.lib.GenExDefines.PATTERN = "Pattern" [static]

6.20.3.16 String genex.lib.GenExDefines.PATTERNS_FOR_CHANNELS = "Select file patterns\nfor channels" [static]

6.20.3.17 String genex.lib.GenExDefines.RGB_IMAGE = "RGB image" [static]

6.20.3.18 final String genex.lib.GenExDefines.RGB_INPUT = "RGB_INPUT"

GenEx library definitions and constants

Author

J. Schier

6.20.3.19 String genex.lib.GenExDefines.SELECT_CHANNELS = "Select channels" [static]

6.20.3.20 String genex.lib.GenExDefines.SELECT_CSV_DIR = "Select directory for results" [static]

6.20.3.21 String genex.lib.GenExDefines.SELECT_DIR = "Select image directory" [static]

6.20.3.22 Method genex.lib.GenExDefines.thresholdMethod = AutoThresholder.Method.Otsu [static]

6.20.3.23 String genex.lib.GenExDefines.TRUE = "true" [static]

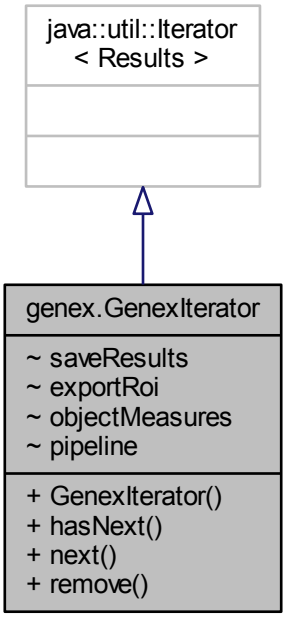
6.20.3.24 String genex.lib.GenExDefines.VALID = "Valid" [static]

The documentation for this class was generated from the following file:

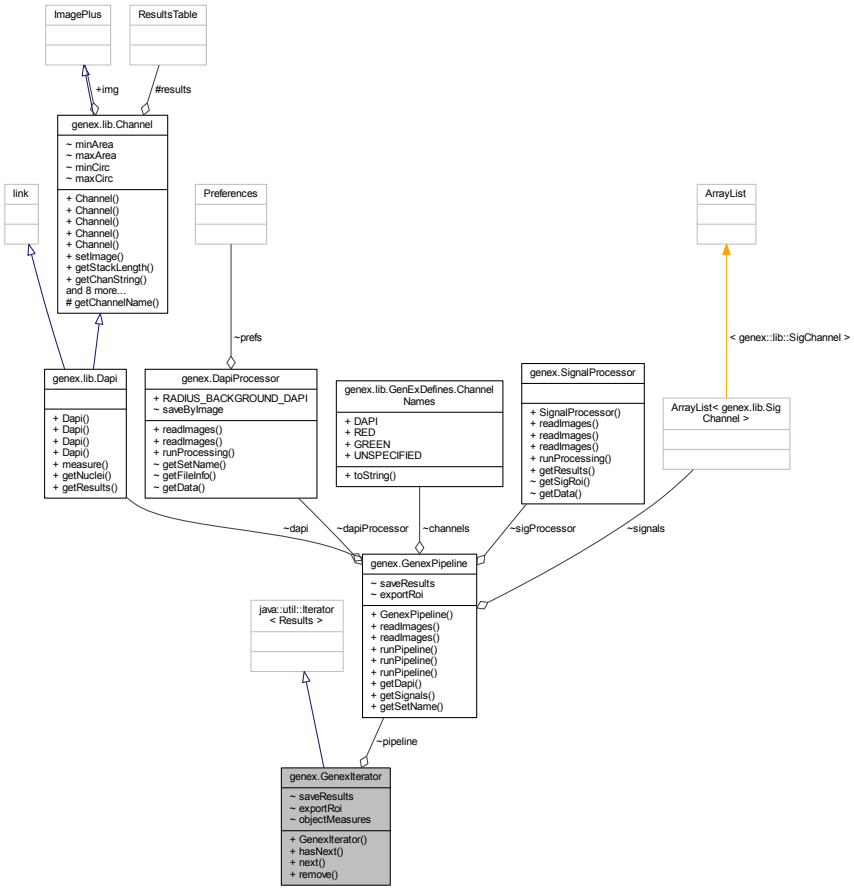
- src/genex/lib/GenExDefines.java

6.21 genex.GenexIterator Class Reference

Inheritance diagram for genex.GenexIterator:



Collaboration diagram for genex.GenexIterator:



Public Member Functions

- GenexIterator (int objectMeasures, ChannelNames[] channels)
- boolean hasNext ()
- Results next ()
- void remove ()

Package Attributes

- final boolean saveResults = true
- final boolean exportRoi = true
- final int objectMeasures
- GenexPipeline pipeline = null

6.21.1 Detailed Description

Author

J. Schier

6.21.2 Constructor & Destructor Documentation

6.21.2.1 genex.GenexIterator.GenexIterator (int *objectMeasures,* ChannelNames[] *channels*)

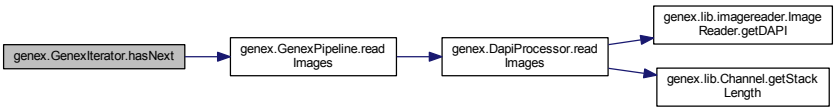
Parameters

channels	TODO

6.21.3 Member Function Documentation

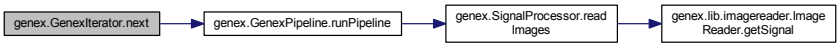
6.21.3.1 boolean genex.GenexIterator.hasNext ( )

Here is the call graph for this function:



6.21.3.2 Results genex.GenexIterator.next ( )

Here is the call graph for this function:



6.21.3.3 void genex.GenexIterator.remove ( )

6.21.4 Member Data Documentation

6.21.4.1 final boolean genex.GenexIterator.exportRoi = true [package]

6.21.4.2 final int genex.GenexIterator.objectMeasures [package]

6.21.4.3 GenexPipeline genex.GenexIterator.pipeline = null [package]

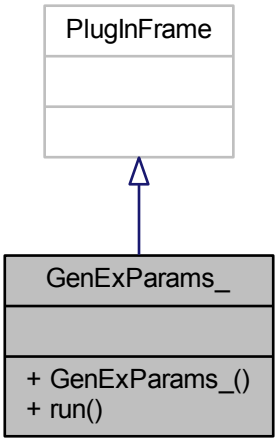
6.21.4.4 final boolean genex.GenexIterator.saveResults = true [package]

The documentation for this class was generated from the following file:

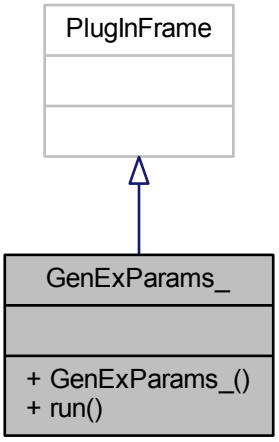
- src/genex/GenexIterator.java

6.22 GenExParams_ Class Reference

Inheritance diagram for GenExParams_:



Collaboration diagram for GenExParams_:



Public Member Functions

- GenExParams_ ()
- void run (String arg)

6.22.1 Detailed Description

ImageJ plugin with GUI dialog for parameter input. The plugin is used to generate data regarding channels (DAP↩ I/RED/GREEN) used in the given set, directory of images, file pattern for the given channel

Author

J. Schier

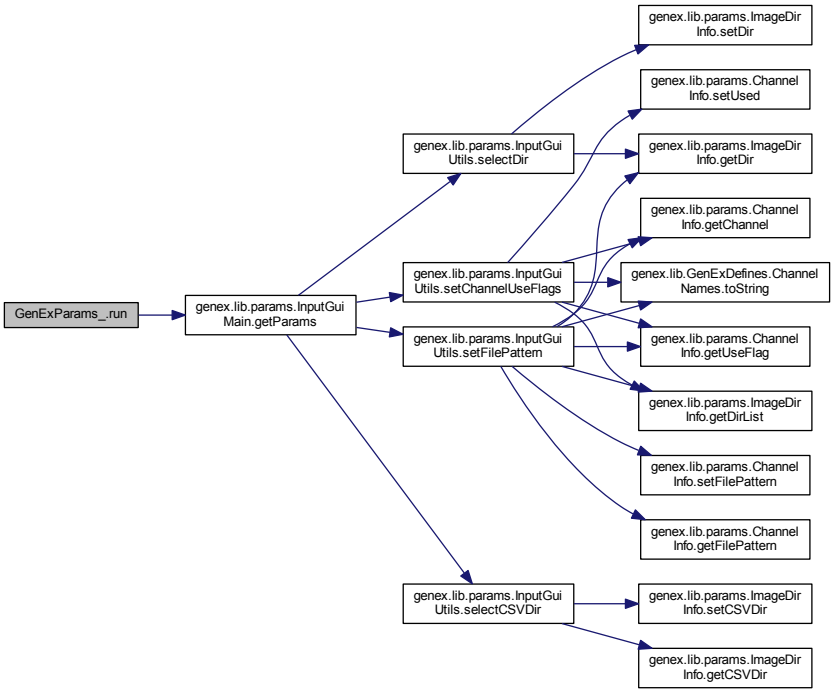
6.22.2 Constructor & Destructor Documentation

6.22.2.1 GenExParams_.GenExParams_ ( )

6.22.3 Member Function Documentation

6.22.3.1 void GenExParams_.run (String *arg*)

Here is the call graph for this function:

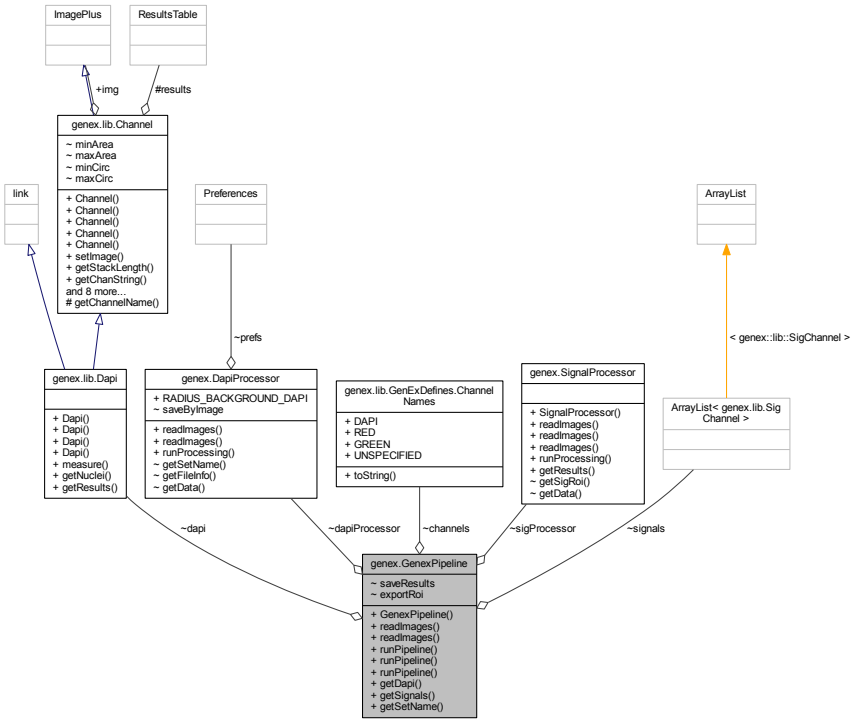


The documentation for this class was generated from the following file:

- src/GenExParams_.java

6.23 genex.GenexPipeline Class Reference

Collaboration diagram for genex.GenexPipeline:



Public Member Functions

- GenexPipeline (ChannelNames[] channels)
- int readImages ()
- int readImages (String fname)
- Results runPipeline (int objectMeasures)
- Results runPipeline (ArrayList< String > fname, int objectMeasures)
- Results runPipeline (String fname, int objectMeasures)
- Dapi getDapi ()
- ArrayList< SigChannel > getSignals ()
- String getSetName ()

Package Attributes

- final boolean saveResults = true
- final boolean exportRoi = true
- final ChannelNames[] channels
- DapiProcessor dapiProcessor = new DapiProcessor()
- SignalProcessor sigProcessor
- ArrayList< SigChannel > signals = null
- Dapi dapi = null

6.23.1 Detailed Description

Author

J. Schier

6.23.2 Constructor & Destructor Documentation

6.23.2.1 genex.GenexPipeline.GenexPipeline (ChannelNames[] *channels*)

6.23.3 Member Function Documentation

6.23.3.1 Dapi genex.GenexPipeline.getDapi ( )

6.23.3.2 String genex.GenexPipeline.getSetName ( )

Here is the call graph for this function:

6.23.3.3 ArrayList<SigChannel> genex.GenexPipeline.getSignals ( )

6.23.3.4 int genex.GenexPipeline.readImages ( )

Reads one or more dapi images (depends on processByImage setting) into DapiProcessor

Returns

length of image stack: >0 there are images to process ==0 all images processed -1 reading error

Here is the call graph for this function:

6.23.3.5 int genex.GenexPipeline.readImages (String *fname*)

Reads image fname into DapiProcessor processing may continue on subsequent images using readImages()

Returns

length of image stack: >0 there are images to process ==0 all images processed -1 reading error

Here is the call graph for this function:

6.23.3.6 Results genex.GenexPipeline.runPipeline (int *objectMeasures*)

Run image processing pipeline: read all images from input source and process them

Parameters

objectMeasures	object parameters to measure

Returns

Results packed Results table and extRois

Here is the call graph for this function:

6.23.3.7 Results genex.GenexPipeline.runPipeline (ArrayList< String > *fname,* int *objectMeasures*)

Run image processing pipeline: read images denoted by fname array and process them (version for individual channel images). Processing may continue on subsequent images if runPipeline(int objectMeasures) is used in subsequent calls. fname is an array of Strings, one per channel to read

Parameters

objectMeasures	object parameters to measure

Returns

Results packed Results table and extRois

Here is the call graph for this function:

6.23.3.8 Results genex.GenexPipeline.runPipeline (String *fname,* int *objectMeasures*)

Run image processing pipeline: read image denoted by fname from input source and process it (version for RGB images). Processing may continue on subsequent images if runPipeline(int objectMeasures) is used in subsequent calls. fname is single String, common for both R and G channel. Which channel to read depends on setting of channels array (initialized in Constructor)

Parameters

objectMeasures	object parameters to measure

Returns

Results packed Results table and extRois

Here is the call graph for this function:

6.23.4 Member Data Documentation

6.23.4.1 final ChannelNames [] genex.GenexPipeline.channels [package]

6.23.4.2 Dapi genex.GenexPipeline.dapi = null [package]

6.23.4.3 DapiProcessor genex.GenexPipeline.dapiProcessor = new DapiProcessor() [package]

6.23.4.4 final boolean genex.GenexPipeline.exportRoi = true [package]

6.23.4.5 final boolean genex.GenexPipeline.saveResults = true [package]

6.23.4.6 ArrayList<SigChannel> genex.GenexPipeline.signals = null [package]

6.23.4.7 SignalProcessor genex.GenexPipeline.sigProcessor [package]

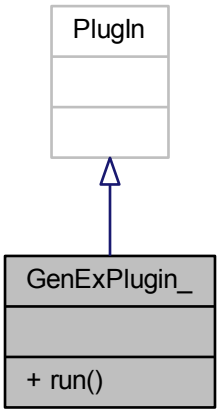
The documentation for this class was generated from the following file:

- src/genex/GenexPipeline.java

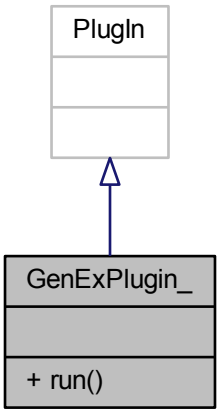
6.24 GenExPlugin_ Class Reference

Plugin entry class.

Inheritance diagram for GenExPlugin_:



Collaboration diagram for GenExPlugin_:



Public Member Functions

- void run (String arg)

6.24.1 Detailed Description

Plugin entry class.

This plugin contains implementation of image processing methods for FISH microscopy images with centromeric probes for the GenEx project.

It contains methods for denoising, background correction, threshold segmentation, and for object analysis

Author

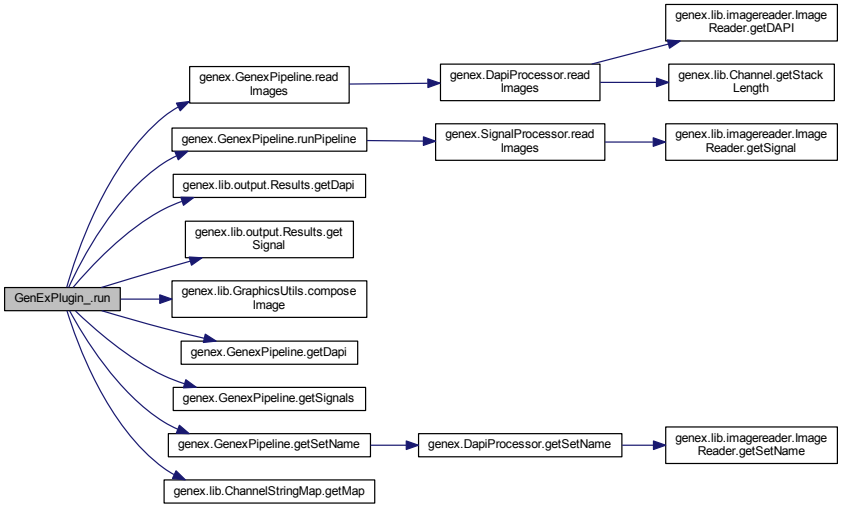
J. Schier, B. Kovář

6.24.2 Member Function Documentation

6.24.2.1 void GenExPlugin_.run (String *arg*)

Plugin entry point

Here is the call graph for this function:

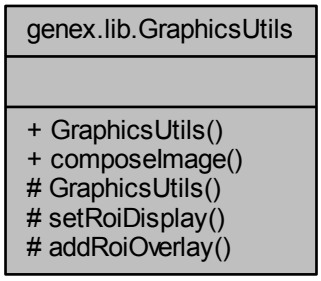


The documentation for this class was generated from the following file:

- src/GenExPlugin_.java

6.25 genex.lib.GraphicsUtils Class Reference

Collaboration diagram for genex.lib.GraphicsUtils:



Public Member Functions

- GraphicsUtils ()
- ImagePlus composeImage (final Dapi dapi, final ChannelNames[] channels, ArrayList< SigChannel > signals, String setName)

Protected Member Functions

- GraphicsUtils (ArrayList< ChannelNames > chanNames, ArrayList< Color > colors)
- void setRoiDisplay (ExtRoi roi)
- void addRoiOverlay (ArrayList< ExtRoi > rois, Overlay overlay)

6.25.1 Detailed Description

Helper utilities for display of detected objects

Author

J. Schier

6.25.2 Constructor & Destructor Documentation

6.25.2.1 genex.lib.GraphicsUtils.GraphicsUtils (ArrayList< ChannelNames > *chanNames*, ArrayList< Color > *colors*) [protected]

Constructor - defines channel - color mapping using list of channel identifiers and list of colors

Parameters

chanNames	channel identifiers

colors	corresponding channel colors

6.25.2.2 genex.lib.GraphicsUtils.GraphicsUtils ( )

Constructor - defines default channel mapping

6.25.3 Member Function Documentation

6.25.3.1 void genex.lib.GraphicsUtils.addRoiOverlay (ArrayList< ExtRoi > *rois*, Overlay *overlay*) [protected]

Adds extRoi detected in the given channel to overlay using the corresponding color

Parameters

rois	list of extended ROIs
overlay	image overlay

6.25.3.2 ImagePlus genex.lib.GraphicsUtils.composeImage (final Dapi *dapi*, final ChannelNames[] *channels*, ArrayList< SigChannel > *signals*, String *setName*)

Compose RGB image out of DAPI channel and signals

Parameters

dapi	dapi channel
channels	channel names (see GenExDefines.ChannelNames)
signals	list of signal channels
setName	name of the input image

Returns

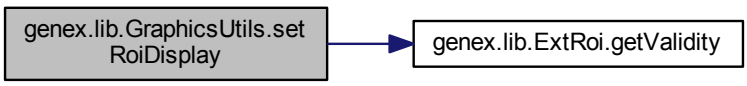
6.25.3.3 void genex.lib.GraphicsUtils.setRoiDisplay (ExtRoi *roi*) [protected]

Call methods to set the display parameters for valid/invalid objects

Parameters

roi	object to display

Here is the call graph for this function:

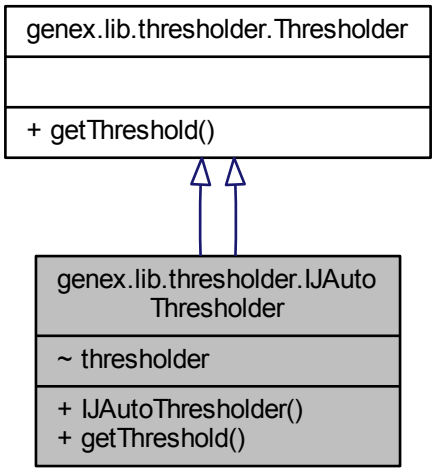


The documentation for this class was generated from the following file:

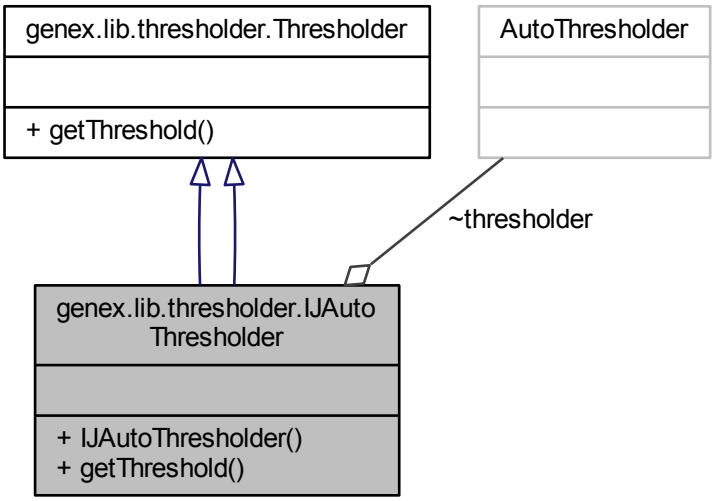
- src/genex/lib/GraphicsUtils.java

6.26 genex.lib.thresholder.IJAutoThresholder Class Reference

Inheritance diagram for genex.lib.thresholder.IJAutoThresholder:



Collaboration diagram for genex.lib.thresholder.IJAutoThresholder:



Public Member Functions

- IJAutoThresholder ()
- int[] getThreshold (ImagePlus img)

Package Attributes

- AutoThresholder thresholder = null

6.26.1 Detailed Description

Author

J. Schier

6.26.2 Constructor & Destructor Documentation

6.26.2.1 genex.lib.thresholder.IJAutoThresholder.IJAutoThresholder ( )

6.26.3 Member Function Documentation

6.26.3.1 int [] genex.lib.thresholder.IJAutoThresholder.getThreshold (ImagePlus *img*)

get image threshold

Parameters

img	input image (contains stack of 1 or more images)

Returns

array of thresholds

Implements genex.lib.thresholder.Thresholder.

6.26.4 Member Data Documentation

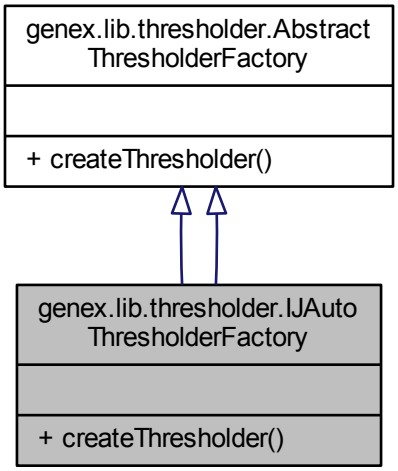
6.26.4.1 AutoThresholder genex.lib.thresholder.IJAutoThresholder.thresholder = null [package]

The documentation for this class was generated from the following file:

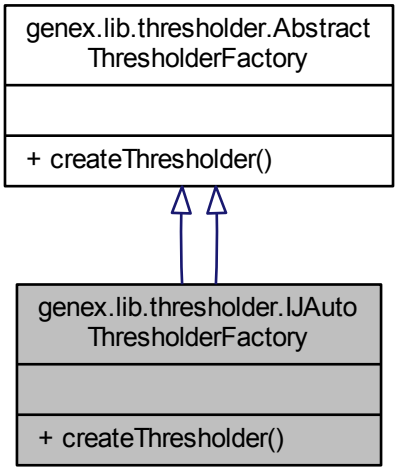
- src/genex/lib/thresholder/IJAutoThresholder.java

6.27 genex.lib.thresholder.IJAutoThresholderFactory Class Reference

Inheritance diagram for genex.lib.thresholder.IJAutoThresholderFactory:



Collaboration diagram for genex.lib.thresholder.IJAutoThresholderFactory:



Public Member Functions

- Thresholder createThresholder ()

6.27.1 Detailed Description

ImageJ autothresholder factory

Author

J. Schier

6.27.2 Member Function Documentation

6.27.2.1 Thresholder genex.lib.thresholder.IJAutoThresholderFactory.createThresholder ( )

Create thresholder instance

Returns

Thresholder

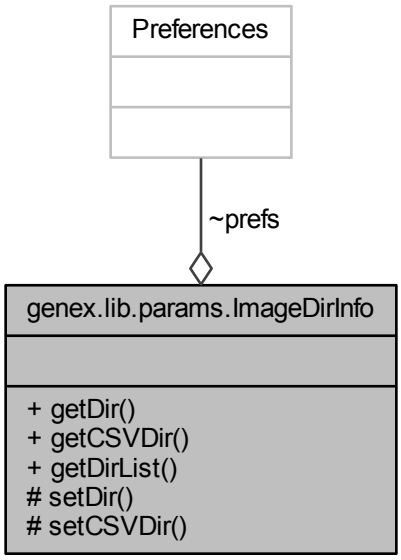
Implements genex.lib.thresholder.AbstractThresholderFactory.

The documentation for this class was generated from the following file:

- src/genex/lib/thresholder/IJAutoThresholderFactory.java

6.28 genex.lib.params.ImageDirInfo Class Reference

Collaboration diagram for genex.lib.params.ImageDirInfo:



Public Member Functions

- String getDir ()

- String getCSVDir ()
- File[] getDirList (String pattern, String dir)

Protected Member Functions

- void setDir (String dir)
- void setCSVDir (String dir)

Package Attributes

- Preferences prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)

6.28.1 Detailed Description

Methods to access and store image directory information

Author

J. Schier

6.28.2 Member Function Documentation

6.28.2.1 String genex.lib.params.ImageDirInfo.getCSVDir ( )

Get the directory for the CSV result files from Preferences. If not set, use the image directory of the user home directory.

Returns

Image directory

6.28.2.2 String genex.lib.params.ImageDirInfo.getDir ( )

Get last used directory from Preferences. If not set, use the user home directory.

Returns

Image directory

6.28.2.3 File [] genex.lib.params.ImageDirInfo.getDirList (String *pattern*, String *dir*)

Get directory listing conforming given pattern. Only image files with extensions .tif, .tiff, .bmp, .png and .jpg are listed, case insensitive.

Parameters

pattern	get filenames containing this pattern. No regex characters (targeted to users who have never heard of regex).

dir	location of image directory

Returns

array of File objects.

6.28.2.4 void genex.lib.params.ImageDirInfo.setCSVDir (String *dir*) [protected]

Store CSV directory dir to preferences. Only performed if dir is non-null

Parameters

dir	

6.28.2.5 void genex.lib.params.ImageDirInfo.setDir (String *dir*) [protected]

Store directory dir to preferences. Only performed if dir is non-null

Parameters

dir	

6.28.3 Member Data Documentation

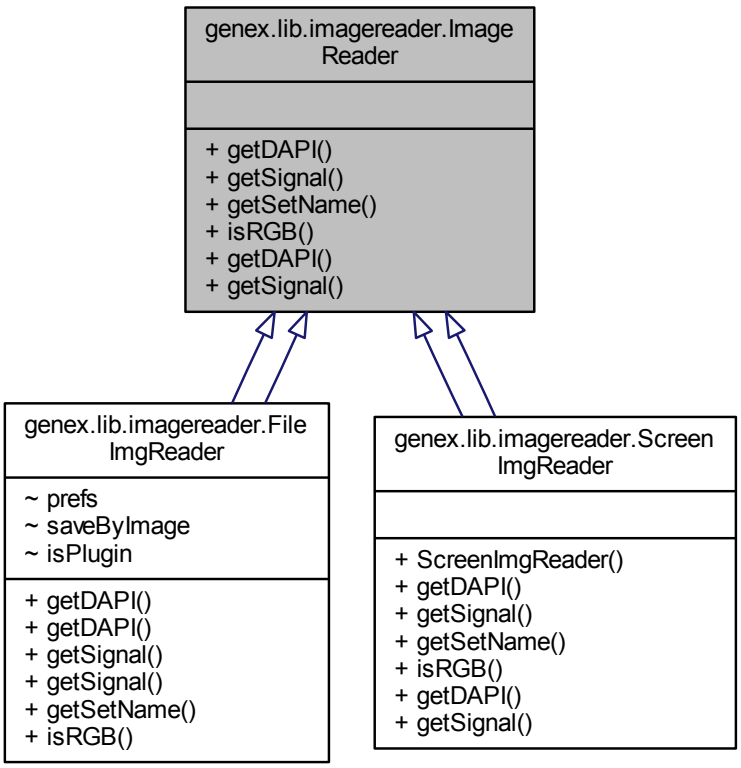
6.28.3.1 Preferences genex.lib.params.ImageDirInfo.prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT) [package]

The documentation for this class was generated from the following file:

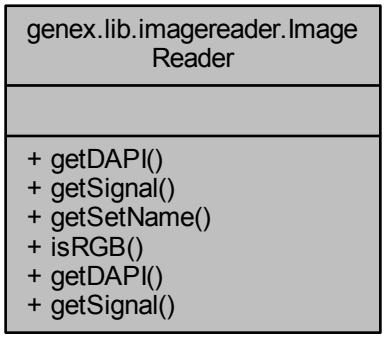
- src/genex/lib/params/ImageDirInfo.java

6.29 genex.lib.imagereader.ImageReader Interface Reference

Inheritance diagram for genex.lib.imagereader.ImageReader:



Collaboration diagram for genex.lib.imagereader.ImageReader:



Public Member Functions

- abstract Dapi getDAPI ()
- abstract SigChannel getSignal (ChannelNames channel)
- abstract String getSetName ()
- abstract boolean isRGB ()
- abstract Dapi getDAPI (String filename)
- abstract SigChannel getSignal (String filename, ChannelNames channel)

6.29.1 Detailed Description

Interface for image reader implementations

Author

J. Schier

6.29.2 Member Function Documentation

6.29.2.1 abstract Dapi genex.lib.imagereader.ImageReader.getDAPI ( ) [abstract]

Get the DAPI channel

Returns

object containing the DAPI image

Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

6.29.2.2 abstract Dapi genex.lib.imagereader.ImageReader.getDAPI (String *filename*) [abstract]

Get the DAPI channel Returns null if the filename is not found

Parameters

filename	name of image to read

Returns

object containing the DAPI image

Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

6.29.2.3 abstract String genex.lib.imagereader.ImageReader.getSetName ( ) [abstract]

Get the name of the image set

Returns

set name

Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

6.29.2.4 abstract SigChannel genex.lib.imagereader.ImageReader.getSignal (ChannelNames *channel*) [abstract]

Get single signal channel

Parameters

channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

6.29.2.5 abstract SigChannel genex.lib.imagereader.ImageReader.getSignal (String *filename,* ChannelNames *channel*) [abstract]

Get single signal channel Returns null if the filename is not found

Parameters

filename	name of image to read
channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

6.29.2.6 abstract boolean genex.lib.imagereader.ImageReader.isRGB ( ) [abstract]

Returns

true for RGB input images

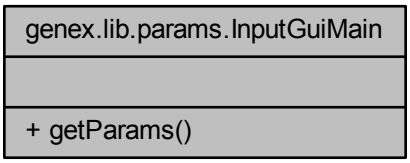
Implemented in genex.lib.imagereader.FileImgReader, and genex.lib.imagereader.ScreenImgReader.

The documentation for this interface was generated from the following file:

- src/genex/lib/imagereader/ImageReader.java

6.30 genex.lib.params.InputGuiMain Class Reference

Collaboration diagram for genex.lib.params.InputGuiMain:



Public Member Functions

- void getParams ()

6.30.1 Detailed Description

Helper class used to set up dialog for input parameters (location of image directory, which channels are used, file pattern for each channel). Parameters are initialized from ChannelInfo object.

Author

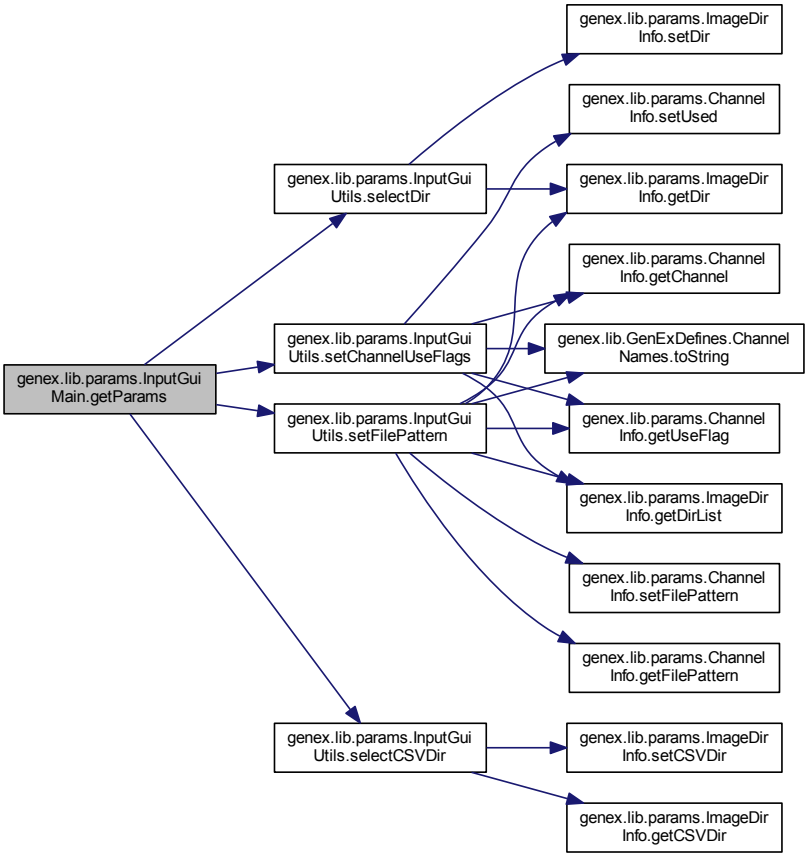
J. Schier

6.30.2 Member Function Documentation

6.30.2.1 void genex.lib.params.InputGuiMain.getParams ( )

Helper method used to create the ChannelInfo objects for DAPI and signals and to call input dialog methods.

Here is the call graph for this function:

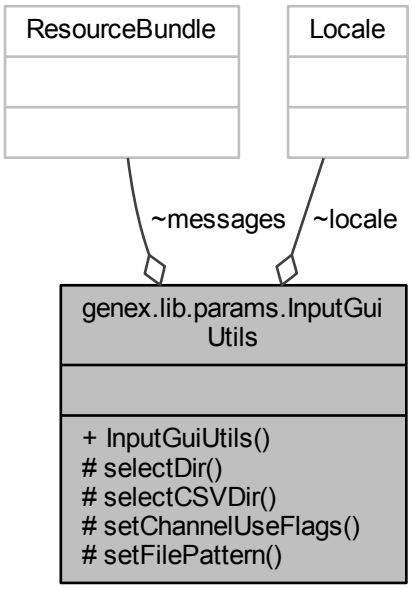


The documentation for this class was generated from the following file:

- src/genex/lib/params/InputGuiMain.java

6.31 genex.lib.params.InputGuiUtils Class Reference

Collaboration diagram for genex.lib.params.InputGuiUtils:



Public Member Functions

- InputGuiUtils ()

Protected Member Functions

- String selectDir ()
- String selectCSVDir ()
- Boolean setChannelUseFlags (ArrayList< ChannelInfo > channelInfo, String dir)
- void setFilePattern (ArrayList< ChannelInfo > channelInfo)

Package Attributes

- Locale locale
- ResourceBundle messages

6.31.1 Detailed Description

GUI for file directory selection

Author

J. Schier

6.31.2 Constructor & Destructor Documentation

6.31.2.1 genex.lib.params.InputGuiUtils.InputGuiUtils ( )

6.31.3 Member Function Documentation

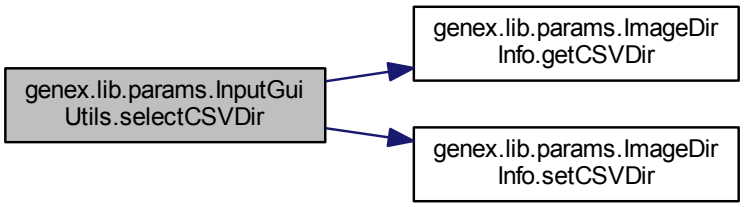
6.31.3.1 String genex.lib.params.InputGuiUtils.selectCSVDir ( ) [protected]

Select the directory for storing csv files with results. Defaults to the image directory, if selected, or the home directory if the image directory was not selected yet, or null if cancelled

Returns

result directory path

Here is the call graph for this function:



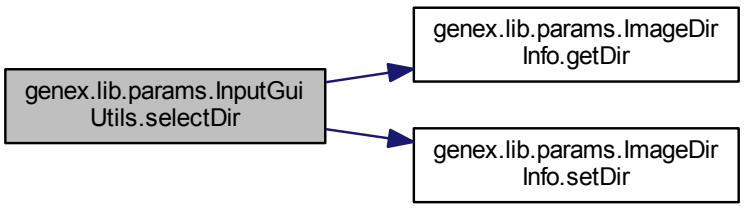
6.31.3.2 String genex.lib.params.InputGuiUtils.selectDir ( ) [protected]

Select the image directory. Returns the image directory, or the home directory if the image directory was not selected yet, or null if cancelled

Returns

image directory path

Here is the call graph for this function:



6.31.3.3 Boolean genex.lib.params.InputGuiUtils.setChannelUseFlags (ArrayList< ChannelInfo > *channelInfo,* String *dir*) [protected]

Set channel use flags in the ChannelInfo records

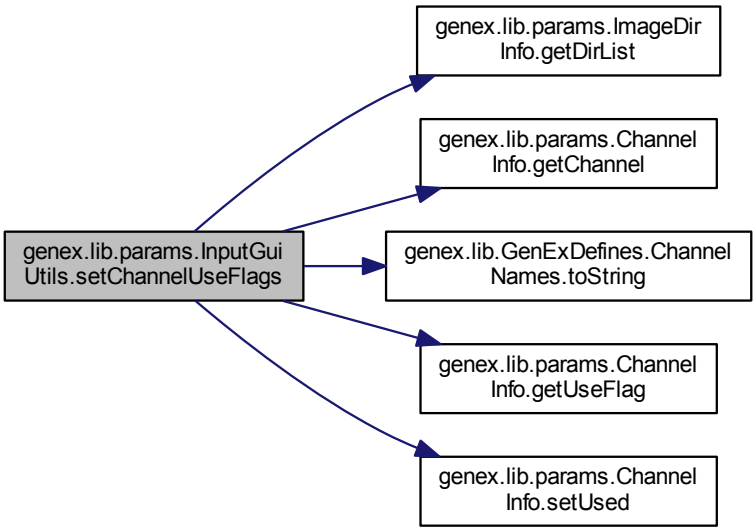
Parameters

channelInfo	List of Channel information records (see genex.lib.params.ChannelInfo)
dir	image directory

Returns

return true on successful setting of use flags, false if cancelled.

Here is the call graph for this function:



6.31.3.4 void genex.lib.params.InputGuiUtils.setFilePattern (ArrayList< ChannelInfo > *channelInfo*) [protected]

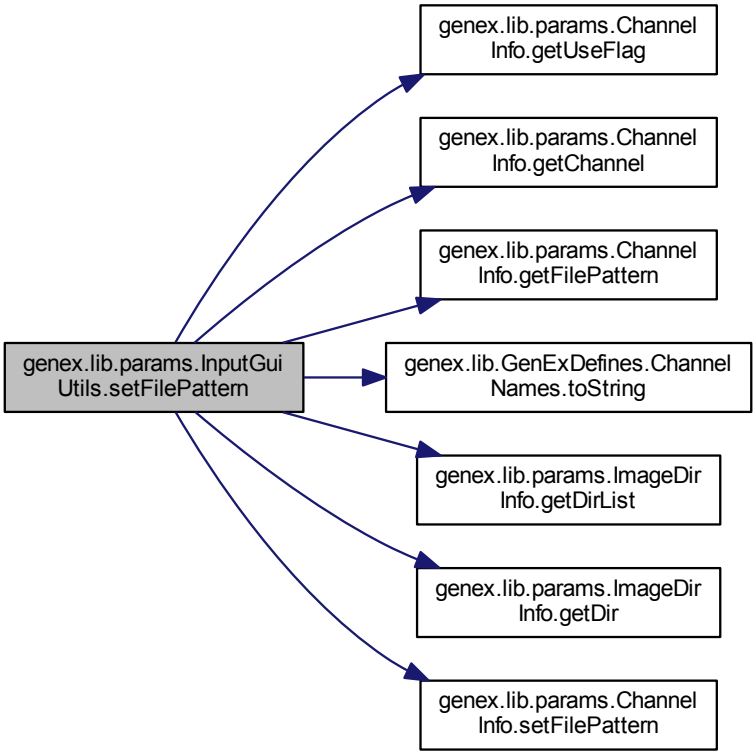
Enter the file pattern common for images in one channel. Checks for illegal characters in input (does not allow regexp characters for simplicity). If an illegal input detected, an error messages is displayed and the dialog GUI is presented again.

Information is stored to the ChannelInfo object and to java Preferences registers.

Parameters

channelInfo	Array of ChannelInfo objects

Here is the call graph for this function:



6.31.4 Member Data Documentation

6.31.4.1 Locale genex.lib.params.InputGuiUtils.locale [package]

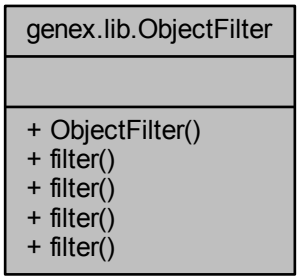
6.31.4.2 ResourceBundle genex.lib.params.InputGuiUtils.messages [package]

The documentation for this class was generated from the following file:

- src/genex/lib/params/InputGuiUtils.java

6.32 genex.lib.ObjectFilter Class Reference

Collaboration diagram for genex.lib.ObjectFilter:



Public Member Functions

- ObjectFilter (int minArea, int maxArea, double minCirc, double maxCirc)
- boolean filter (Roi roi, ResultsTable results)
- void filter (ExtRoi extRoi, ResultsTable results)
- boolean[] filter (Roi[] roi, ResultsTable results)
- void filter (ArrayList< ExtRoi > rois, ResultsTable results)

6.32.1 Detailed Description

Computation of signal statistical parameters, general object filtering

Author

J. Schier, B. Kovář

6.32.2 Constructor & Destructor Documentation

6.32.2.1 genex.lib.ObjectFilter.ObjectFilter (int *minArea,* int *maxArea,* double *minCirc,* double *maxCirc*)

6.32.3 Member Function Documentation

6.32.3.1 boolean genex.lib.ObjectFilter.filter (Roi *roi,* ResultsTable *results*)

Filter roi by area and circularity, as set by class constructor. The result is stored into the results table, column "Valid", in the row with label corresponding with the roi name and passed as the return value. ImageJ Roi class is used.

Parameters

roi	input roi (see http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html)

results	results table

Returns

valid/invalid roi

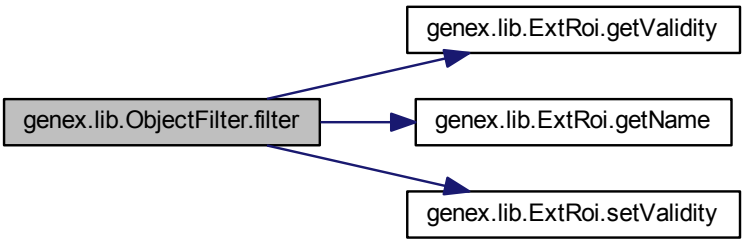
6.32.3.2 void genex.lib.ObjectFilter.filter (ExtRoi *extRoi,* ResultsTable *results*)

Filter ExtRoi by area and circularity, as set by class constructor. The result (boolean valid{invalid) is stored into the corresponding ExtRoi parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. ExtRoi class is used.

Parameters

extRoi	input roi (see (ExtRoi)
results	results table

Here is the call graph for this function:



6.32.3.3 boolean [ ] genex.lib.ObjectFilter.filter (Roi[ ] *roi,* ResultsTable *results*)

Filter an array of roi by area and circularity, as set by class constructor. The result is stored into the results table, column "Valid" and passed in the return array. ImageJ Roi class is used.

Parameters

roi	input roi (see http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html)
results	results table

Returns

valid/invalid roi

6.32.3.4 void genex.lib.ObjectFilter.filter (ArrayList< ExtRoi > *rois,* ResultsTable *results*)

Filter list of ExtRoi by area and circularity, as set by class constructor. The result (boolean valid{invalid) is, for each particle, stored into the corresponding ExtRoi parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. ExtRoi class is used.

Parameters

results	results table
extRoi	input roi (see (ExtRoi)

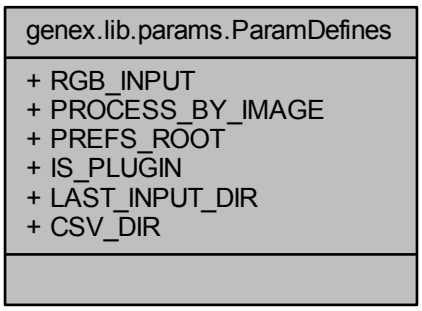
Here is the call graph for this function:

The documentation for this class was generated from the following file:

- src/genex/lib/ObjectFilter.java

6.33 genex.lib.params.ParamDefines Class Reference

Collaboration diagram for genex.lib.params.ParamDefines:



Static Public Attributes

- static String RGB_INPUT = "RGB_INPUT"
- static String PROCESS_BY_IMAGE = "SAVE_BY_IMAGE"
- static String PREFS_ROOT = "genex"
- static String IS_PLUGIN = "IS_PLUGIN"
- static String LAST_INPUT_DIR = "LAST_INPUT_DIR"
- static String CSV_DIR = "CSV_DIR"

6.33.1 Detailed Description

Parameter definitions shared between genex.param classes and file input

Author

J. Schier

6.33.2 Member Data Documentation

6.33.2.1 String genex.lib.params.ParamDefines.CSV_DIR = "CSV_DIR" [static]

6.33.2.2 String genex.lib.params.ParamDefines.IS_PLUGIN = "IS_PLUGIN" [static]

6.33.2.3 String genex.lib.params.ParamDefines.LAST_INPUT_DIR = "LAST_INPUT_DIR" [static]

6.33.2.4 String genex.lib.params.ParamDefines.PREFS_ROOT = "genex" [static]

6.33.2.5 String genex.lib.params.ParamDefines.PROCESS_BY_IMAGE = "SAVE_BY_IMAGE" [static]

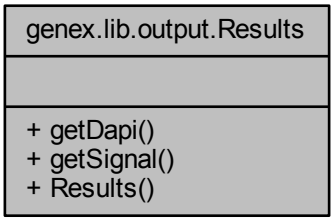
6.33.2.6 String genex.lib.params.ParamDefines.RGB_INPUT = "RGB_INPUT" [static]

The documentation for this class was generated from the following file:

- src/genex/lib/params/ParamDefines.java

6.34 genex.lib.output.Results Class Reference

Collaboration diagram for genex.lib.output.Results:



Public Member Functions

- FISHdata getDapi ()
- FISHdata getSignal ()
- Results (FISHdata dapi, FISHdata signal)

6.34.1 Detailed Description

Helper class to store complete data for one image

Author

J. Schier

6.34.2 Constructor & Destructor Documentation

6.34.2.1 genex.lib.output.Results.Results (FISHdata *dapi,* FISHdata *signal*)

6.34.3 Member Function Documentation

6.34.3.1 FISHdata genex.lib.output.Results.getDapi ( )

Returns

the dapi

6.34.3.2 FISHdata genex.lib.output.Results.getSignal ( )

Returns

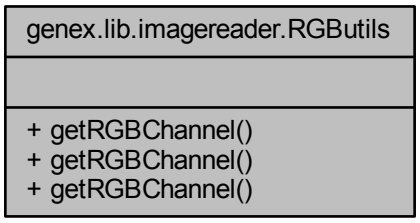
the signal

The documentation for this class was generated from the following file:

- src/genex/lib/output/Results.java

6.35 genex.lib.imagereader.RGButils Class Reference

Collaboration diagram for genex.lib.imagereader.RGButils:



Public Member Functions

- ImagePlus getRGBChannel (ImageStack[] stack, String channelName)
- ImagePlus getRGBChannel (ImageStack[] stack, GenExDefines.ChannelNames channel)
- ImagePlus getRGBChannel (ImagePlus[] input, GenExDefines.ChannelNames channel)

6.35.1 Detailed Description

Utility class for RGB image decomposition

Author

J. Schier, B. Kovář

6.35.2 Member Function Documentation

6.35.2.1 ImagePlus genex.lib.imagereader.RGButils.getRGBChannel (ImageStack[] *stack*, String *channelName*)

Implements selection of single channel from the RGB input stack.

Parameters

stack	input stack of RGB images
channelName	channel selector ("RED"/"GREEN"/"DAPI"|"BLUE")

Returns

selected channel (ImagePlus) or null if the selector is not valid

6.35.2.2 ImagePlus genex.lib.imagereader.RGButils.getRGBChannel (ImageStack[] *stack*, GenExDefines.ChannelNames *channel*)

Implements selection of single channel from the RGB input stack.

Parameters

stack	input array of R, G and B stacks
channel	channel selector RED/GREEN/DAPI) (see genex.lib.GenExDefines.ChannelNames)

Returns

selected channel (ImagePlus) or null if the selector is not valid

6.35.2.3 ImagePlus genex.lib.imagereader.RGButils.getRGBChannel (ImagePlus[] *input*, GenExDefines.ChannelNames *channel*)

Implements selection of single channel from the RGB input stack.

Parameters

input	input array of R, G and B images
channel	channel selector (RED/GREEN/DAPI) (see genex.lib.GenExDefines.ChannelNames)

Returns

selected channel (ImagePlus) or null if the selector is not valid

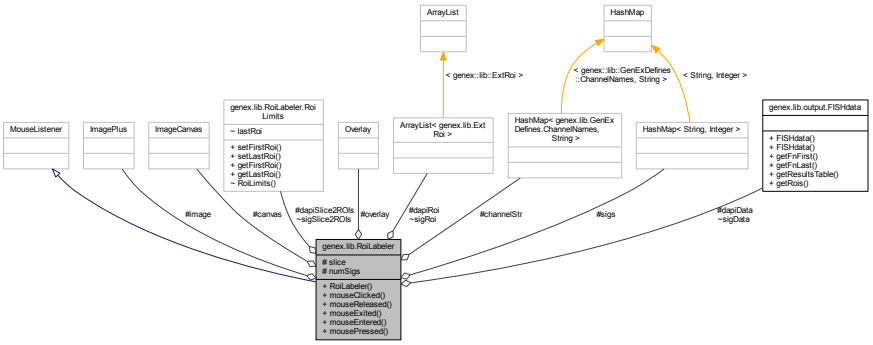
The documentation for this class was generated from the following file:

- src/genex/lib/imagereader/RGButils.java

6.36 genex.lib.RoiLabeler Class Reference

Inheritance diagram for genex.lib.RoiLabeler:

Collaboration diagram for genex.lib.RoiLabeler:



Public Member Functions

- RoiLabeler (ImagePlus img, FISHdata dapiData, FISHdata sigData, HashMap< ChannelNames, String > channelStr)
- void mouseClicked (MouseEvent e)
- void mouseReleased (MouseEvent e)
- void mouseExited (MouseEvent e)
- void mouseEntered (MouseEvent e)
- void mousePressed (MouseEvent e)

Protected Attributes

- ImagePlus image
- Overlay overlay
- ImageCanvas canvas
- int slice
- HashMap< String, Integer > sigs = new HashMap<String, Integer>()
- HashMap< ChannelNames, String > channelStr = new HashMap<ChannelNames, String>()
- FISHdata dapiData
- ArrayList< ExtRoi > dapiRoi
- int numSigs
- RoiLimits dapiSlice2ROIs

Package Attributes

- FISHdata sigData
- ArrayList< ExtRoi > sigRoi
- RoiLimits sigSlice2ROIs

6.36.1 Detailed Description

This class implements simple interactive editor for labeling the objects (nuclei and signals), detected by the plugin. It is used to correct the valid/invalid setting for the objects, to collect the expert input for evaluation of the system.

Author

J. Schier, B. Kovář

6.36.2 Constructor & Destructor Documentation

6.36.2.1 genex.lib.RoiLabeler.RoiLabeler (ImagePlus *img*, FISHdata *dapiData*, FISHdata *sigData*, HashMap< ChannelNames, String > *channelStr*)

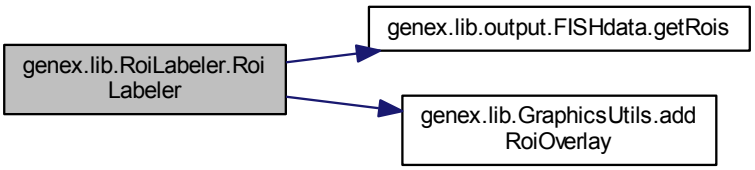
Class constructor for the roi editor

Parameters

img	input RGB image
dapiData	data of the DAPI channel, see FISHdata
sigData	data of the signal channels, see FISHdata

channelStr	hash table for conversion between channel identification tags and the corresponding string descriptions (ChannelStringMap)

Here is the call graph for this function:



6.36.3 Member Function Documentation

6.36.3.1 void genex.lib.RoiLabeler.mouseClicked (MouseEvent *e*)

Event listener, implements behavior on mouse click in the image editor

6.36.3.2 void genex.lib.RoiLabeler.mouseEntered (MouseEvent *e*)

6.36.3.3 void genex.lib.RoiLabeler.mouseExited (MouseEvent *e*)

6.36.3.4 void genex.lib.RoiLabeler.mousePressed (MouseEvent *e*)

6.36.3.5 void genex.lib.RoiLabeler.mouseReleased (MouseEvent *e*)

6.36.4 Member Data Documentation

6.36.4.1 ImageCanvas genex.lib.RoiLabeler.canvas [protected]

6.36.4.2 HashMap<ChannelNames, String> genex.lib.RoiLabeler.channelStr = new HashMap<ChannelNames, String>() [protected]

6.36.4.3 FISHdata genex.lib.RoiLabeler.dapiData [protected]

6.36.4.4 ArrayList<ExtRoi> genex.lib.RoiLabeler.dapiRoi [protected]

6.36.4.5 RoiLimits genex.lib.RoiLabeler.dapiSlice2ROIs [protected]

6.36.4.6 ImagePlus genex.lib.RoiLabeler.image [protected]

6.36.4.7 int genex.lib.RoiLabeler.numSigs [protected]

6.36.4.8 Overlay genex.lib.RoiLabeler.overlay [protected]

6.36.4.9 FISHdata genex.lib.RoiLabeler.sigData [package]

6.36.4.10 ArrayList<ExtRoi> genex.lib.RoiLabeler.sigRoi [package]

6.36.4.11 HashMap<String, Integer> genex.lib.RoiLabeler.sigs = new HashMap<String, Integer>() [protected]

6.36.4.12 RoiLimits genex.lib.RoiLabeler.sigSlice2ROIs [package]

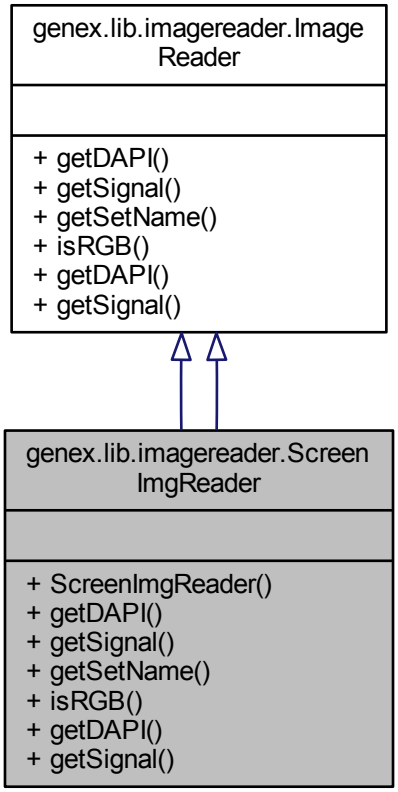
6.36.4.13 int genex.lib.RoiLabeler.slice [protected]

The documentation for this class was generated from the following file:

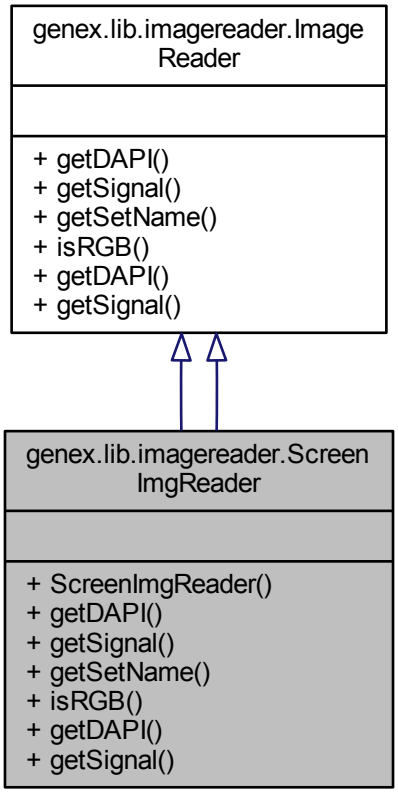
- src/genex/lib/RoiLabeler.java

6.37 genex.lib.imagereader.ScreenImgReader Class Reference

Inheritance diagram for genex.lib.imagereader.ScreenImgReader:



Collaboration diagram for genex.lib.imagereader.ScreenImgReader:



Public Member Functions

- ScreenImgReader ()
- Dapi getDAPI ()
- SigChannel getSignal (ChannelNames channel)
- String getSetName ()
- boolean isRGB ()
- Dapi getDAPI (String filename)
- SigChannel getSignal (String filename, ChannelNames channel)

6.37.1 Detailed Description

Methods for reading the input image from the screen.

Author

J. Schier

6.37.2 Constructor & Destructor Documentation

6.37.2.1 genex.lib.imagereader.ScreenImgReader.ScreenImgReader ( )

Creates a reader instance.

6.37.3 Member Function Documentation

6.37.3.1 Dapi genex.lib.imagereader.ScreenImgReader.getDAPI ( )

Get the DAPI channel

Returns

object containing the DAPI image

Implements genex.lib.imagereader.ImageReader.

6.37.3.2 Dapi genex.lib.imagereader.ScreenImgReader.getDAPI (String *filename*)

Get the DAPI channel Returns null if the filename is not found

Parameters

filename	name of image to read

Returns

object containing the DAPI image

Implements genex.lib.imagereader.ImageReader.

Here is the call graph for this function:

6.37.3.3 String genex.lib.imagereader.ScreenImgReader.getSetName ( )

Get the name of the image set

Returns

set name

Implements genex.lib.imagereader.ImageReader.

6.37.3.4 SigChannel genex.lib.imagereader.ScreenImgReader.getSignal (ChannelNames *channel*)

Get single signal channel

Parameters

channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implements genex.lib.imagereader.ImageReader.

6.37.3.5 SigChannel genex.lib.imagereader.ScreenImgReader.getSignal (String *filename,* ChannelNames *channel*)

Get single signal channel Returns null if the filename is not found

Parameters

filename	name of image to read
channel	string, denoting the channel: "RED", "GREEN"

Returns

signal channel

Implements genex.lib.imagereader.ImageReader.

Here is the call graph for this function:

6.37.3.6 boolean genex.lib.imagereader.ScreenImgReader.isRGB ( )

Returns

true for RGB input images

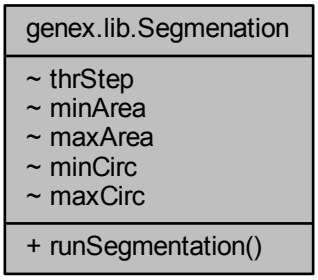
Implements genex.lib.imagereader.ImageReader.

The documentation for this class was generated from the following file:

- src/genex/lib/imagereader/ScreenImgReader.java

6.38 genex.lib.Segmenation Class Reference

Collaboration diagram for genex.lib.Segmenation:



Public Member Functions

- ImagePlus runSegmentation (ImagePlus img, boolean watershed)

Package Attributes

- final int thrStep = 3
- final int minArea = 500
- final int maxArea = 90000
- final double minCirc = .7
- final double maxCirc = 1.0

6.38.1 Detailed Description

Author

J. Schier

6.38.2 Member Function Documentation

6.38.2.1 ImagePlus genex.lib.Segmenation.runSegmentation (ImagePlus *img*, boolean *watershed*)

Perform segmentation of an image, optionally perform watershed segmentation on the result

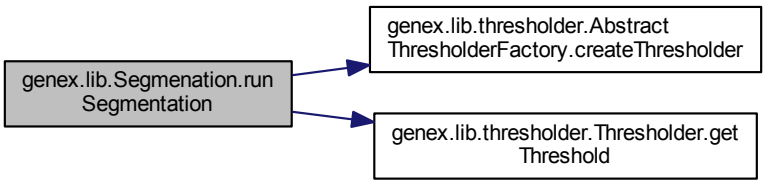
Parameters

img	input image
watershed	perform watershed segmentation

Returns

resulting binary image

Here is the call graph for this function:



6.38.3 Member Data Documentation

6.38.3.1 final int genex.lib.Segmenation.maxArea = 90000 [package]

6.38.3.2 final double genex.lib.Segmenation.maxCirc = 1.0 [package]

6.38.3.3 final int genex.lib.Segmenation.minArea = 500 [package]

6.38.3.4 final double genex.lib.Segmenation.minCirc = .7 [package]

6.38.3.5 final int genex.lib.Segmenation.thrStep = 3 [package]

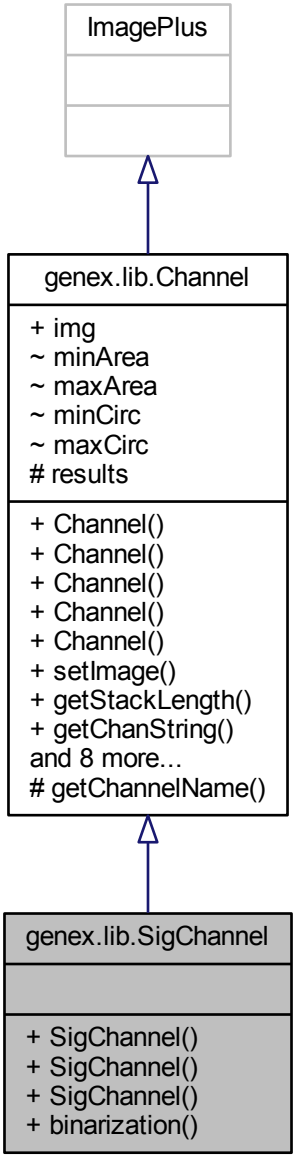
The documentation for this class was generated from the following file:

- src/genex/lib/Segmenation.java

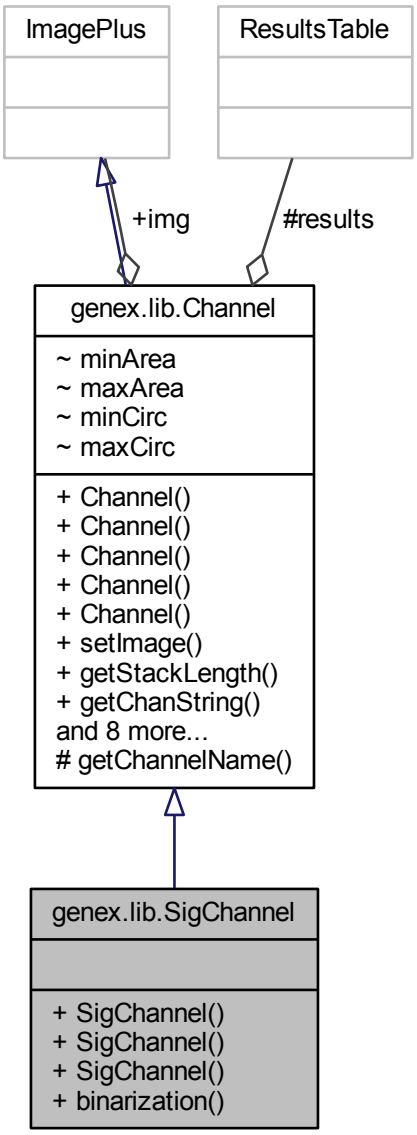
6.39 genex.lib.SigChannel Class Reference

Channel-specific methods for hybridization signals, extends the Channel class.

Inheritance diagram for genex.lib.SigChannel:



Collaboration diagram for genex.lib.SigChannel:



Public Member Functions

- SigChannel (ImageStack[] stack, String channel)
- SigChannel (ImageStack[] stack, ChannelNames channel)
- SigChannel (ImagePlus image, ChannelNames channel)
- void binarization ()

Additional Inherited Members

6.39.1 Detailed Description

Channel-specific methods for hybridization signals, extends the Channel class.

Author

J. Schier, B. Kovář

6.39.2 Constructor & Destructor Documentation

6.39.2.1 genex.lib.SigChannel.SigChannel (ImageStack[] *stack*, String *channel*)

Selects channel from the input RGB stack.

Parameters

stack	input RGB stack
channel	"RED"/"GREEN"/"BLUE" String denoting color of the selected channel

6.39.2.2 genex.lib.SigChannel.SigChannel (ImageStack[] *stack*, ChannelNames *channel*)

Selects channel from the input RGB stack.

Parameters

stack	input RGB stack
channel	RED/GREEN/DAPI identifier of the selected channel GenExDefines.ChannelNames

6.39.2.3 genex.lib.SigChannel.SigChannel (ImagePlus *image*, ChannelNames *channel*)

Constructs signal channel from the input image stack.

Parameters

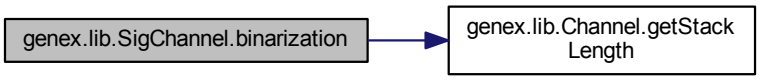
stack	input image stack
channel	RED/GREEN/DAPI identifier of the selected channel GenExDefines.ChannelNames

6.39.3 Member Function Documentation

6.39.3.1 void genex.lib.SigChannel.binarization ( )

Binarization of hybridization signals. Uses threshold segmentation by Renyi Entropy method

Here is the call graph for this function:

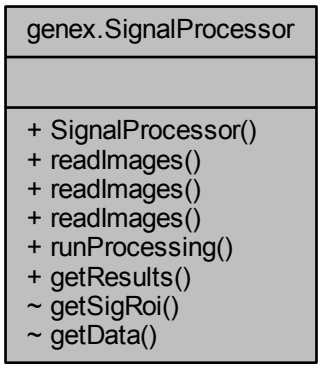


The documentation for this class was generated from the following file:

- src/genex/lib/SigChannel.java

6.40 genex.SignalProcessor Class Reference

Collaboration diagram for genex.SignalProcessor:



Public Member Functions

- SignalProcessor (ChannelNames[] channels)
- int readImages ()
- int readImages (ArrayList< String > fname)
- int readImages (String fname)
- ArrayList< SigChannel > runProcessing (ChannelNames[] channels, ArrayList< ExtRoi > nuclei, int object↩ Measures, boolean saveResults, boolean exportRoi)
- ResultsTable getResults ()

Package Functions

- ArrayList< ExtRoi > getSigRoi ()
- FISHdata getData ()

6.40.1 Detailed Description

This class is used to define the processing flow for the signal channels (RED, GREEN), that is, to call the processing methods from the GenEx library.

Author

J. Schier, B. Kovář

6.40.2 Constructor & Destructor Documentation

6.40.2.1 genex.SignalProcessor.SignalProcessor (ChannelNames[] *channels*)

Constructor - initialize an array of imageReaders, one for each signal channel

Parameters

channels	

6.40.3 Member Function Documentation

6.40.3.1 FISHdata genex.SignalProcessor.getData ( ) [package]

6.40.3.2 ResultsTable genex.SignalProcessor.getResults ( )

Returns

signals result table http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html

6.40.3.3 ArrayList<ExtRoi> genex.SignalProcessor.getSigRoi ( ) [package]

Returns

signal extRois ExtRoi

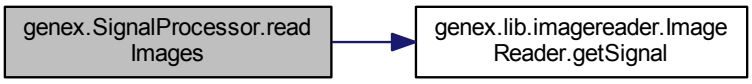
6.40.3.4 int genex.SignalProcessor.readImages ( )

Get input images for signals

Returns

error code: 0=OK, -1= error reading file

Here is the call graph for this function:



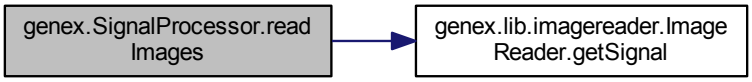
6.40.3.5 int genex.SignalProcessor.readImages (ArrayList< String > *fname*)

Get input images for signals from fname (version for one image per channel) fname should contain one String per each channel to read.

Returns

error code: 0=OK, -1=wrong fname or error reading file

Here is the call graph for this function:



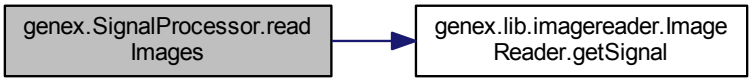
6.40.3.6 int genex.SignalProcessor.readImages (String *fname*)

Get input images for signals from fname (version for RGB images) fname contains common filename for both R and G channel.

Returns

error code: 0=OK, -1=wrong fname or error reading file

Here is the call graph for this function:



6.40.3.7 ArrayList<SigChannel> genex.SignalProcessor.runProcessing (ChannelNames[] *channels,* ArrayList< ExtRoi > *nuclei,* int *objectMeasures,* boolean *saveResults,* boolean *exportRoi*)

This method defines the processing flow of the signal channels

Parameters

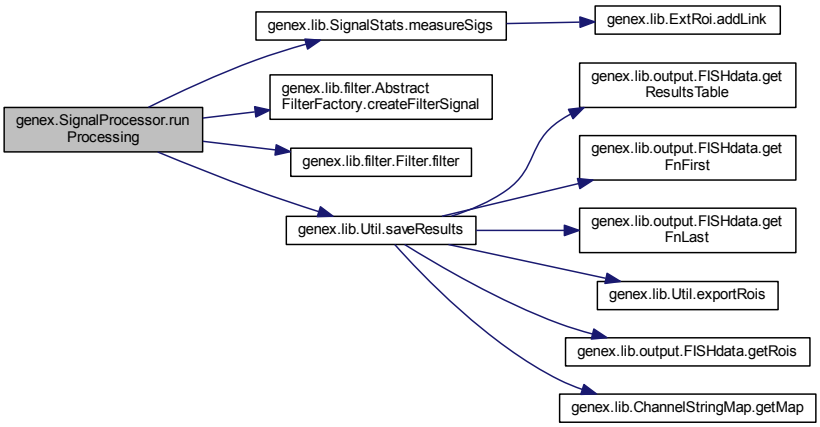
channels	Array of ChannelNames GenExDefines.ChannelNames identifiers, define the channels that are actually used (mainly for the case of RGB input, with only one of the R/G channels used)
nuclei	list of ExtRoi ExtRoi, defining the nuclei (objects) found in the DAPI channel
objectMeasures	object parameters to be measured http://imagej.nih.gov/ij/developer/api/ij/measure/Measurements.html
saveResults	boolean: save the results table http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html to a file

exportRoi	boolean: export ROI http://imagej.nih.gov/ij/developer/api/ij/gui/PolygonRoi.html to a file

Returns

list of signal channels Channel

Here is the call graph for this function:

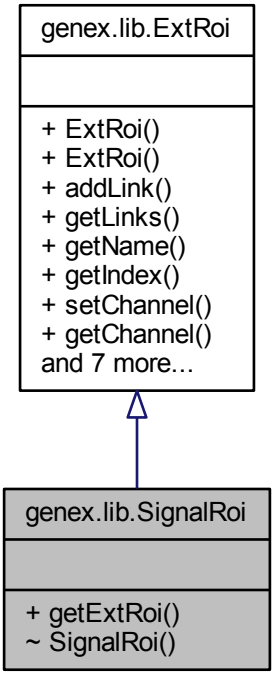


The documentation for this class was generated from the following file:

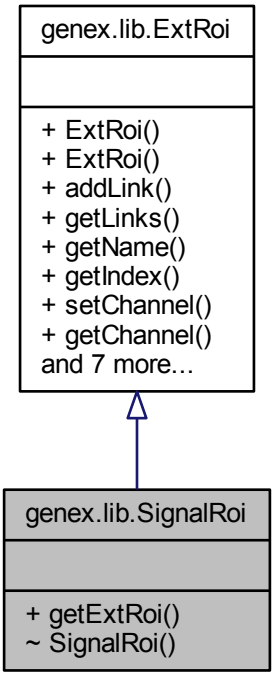
- src/genex/SignalProcessor.java

6.41 genex.lib.SignalRoi Class Reference

Inheritance diagram for genex.lib.SignalRoi:



Collaboration diagram for genex.lib.SignalRoi:



Public Member Functions

- ExtRoi getExtRoi ()

Package Functions

- SignalRoi (Roi signal, ExtRoi extRoi, ChannelNames channel, int idx)

6.41.1 Detailed Description

Signal, detected in nucleus

Author

J. Schier

6.41.2 Constructor & Destructor Documentation

6.41.2.1 genex.lib.SignalRoi.SignalRoi (Roi *signal*, ExtRoi *extRoi*, ChannelNames *channel*, int *idx*) [package]

6.41.3 Member Function Documentation

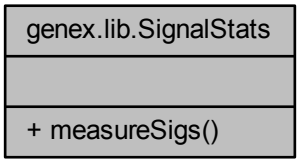
6.41.3.1 ExtRoi genex.lib.SignalRoi.getExtRoi ( )

The documentation for this class was generated from the following file:

- src/genex/lib/SignalRoi.java

6.42 genex.lib.SignalStats Class Reference

Collaboration diagram for genex.lib.SignalStats:



Public Member Functions

- ResultsTable measureSigs (ArrayList< SigChannel > images, ArrayList< ExtRoi > nuclei, ArrayList< ExtRoi > signals, int measures, int minSize, int maxSize)

6.42.1 Member Function Documentation

6.42.1.1 ResultsTable genex.lib.SignalStats.measureSigs (ArrayList< SigChannel > *images,* ArrayList< ExtRoi > *nuclei,* ArrayList< ExtRoi > *signals,* int *measures,* int *minSize,* int *maxSize*)

Measure signals: the binary image of signals, as received from segmentation, is masked by DAPI nuclei (roi). For the signals contained in each nucleus, parameters, as defined by measures, are evaluated. For definition of parameters, see http://imagej.nih.gov/ij/docs/guide/146-30.html#sub:Set-Measurements... and http://imagej.↩ nih.gov/ij/developer/api/ij/measure/ResultsTable.html. The resulting data is stored in the sigResults ResultsTable. Signals are filtered by minSize and maxSize.

Parameters

images	input images of signals, list of image stacks. Arbitrary number of channels may be passed, each with a stack of images.
nuclei	list of nuclei, stored in extended rois (ExtRoi)
signals	list of signal rois, stored in extended rois
measures	parameter definition
minSize	minimum particle size in pixels
maxSize	maximum particle size in pixels

Returns

result table

Here is the call graph for this function:

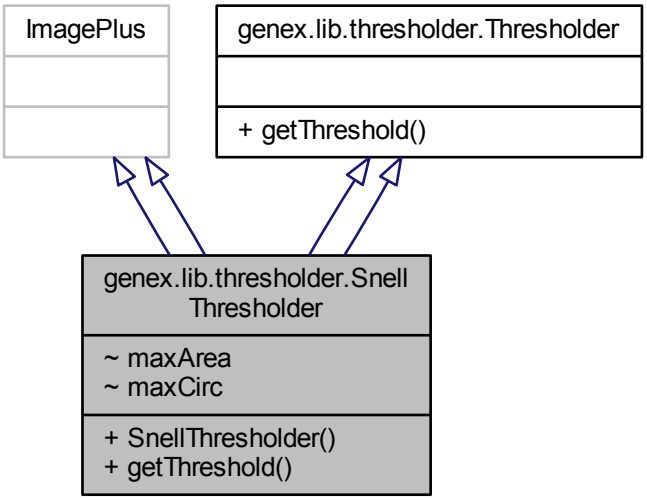
The documentation for this class was generated from the following file:

- src/genex/lib/SignalStats.java

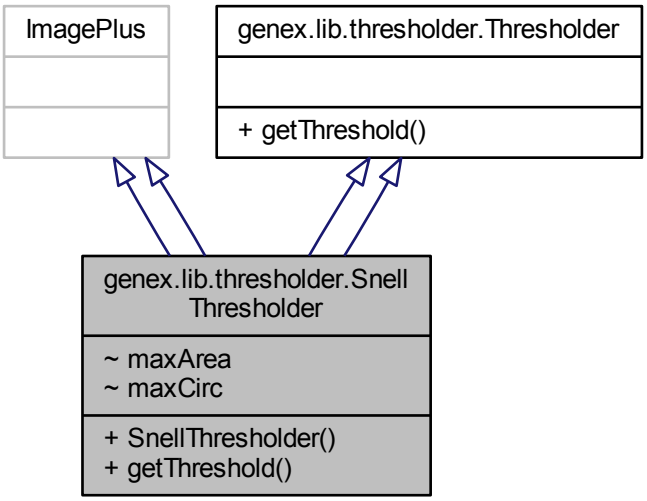
6.43 genex.lib.thresholder.SnellThresholder Class Reference

Implementation of Violet Snell segmentation.

Inheritance diagram for genex.lib.thresholder.SnellThresholder:



Collaboration diagram for genex.lib.thresholder.SnellThresholder:



Public Member Functions

- SnellThresholder (int minArea, int maxArea, double minCirc, double maxCirc, int minThr, int thrStep, boolean stack)
- int[] getThreshold (ImagePlus img)

Package Attributes

- final int maxArea
- final double maxCirc

6.43.1 Detailed Description

Implementation of Violet Snell segmentation.

Author

J. Schier

6.43.2 Constructor & Destructor Documentation

6.43.2.1 genex.lib.thresholder.SnellThresholder.SnellThresholder (int *minArea*, int *maxArea*, double *minCirc*, double *maxCirc*, int *minThr*, int *thrStep*, boolean *stack*)

Segmentation by the Violet Snell method.

Parameters

minArea	minimum area of detected objects
maxArea	maximum area of detected objects
minCirc	minimum circularity of detected objects
maxCirc	maximum circularity of detected objects
minThr	minimum allowed threshold to use (user input)
thrStep	threshold decrease step

See also

`Snell et al: Segmentation and shape classification of nuclei, Centre for Vision, Signal Processing and Speech, University of Surrey`

6.43.3 Member Function Documentation

6.43.3.1 int [] genex.lib.thresholder.SnellThresholder.getThreshold (ImagePlus *img*)

Segmentation by the Violet Snell method. Run the computation.

Parameters

img	input stack of 8-bit grayscale images

Implements genex.lib.thresholder.Thresholder.

6.43.4 Member Data Documentation

6.43.4.1 final int genex.lib.thresholder.SnellThresholder.maxArea [package]

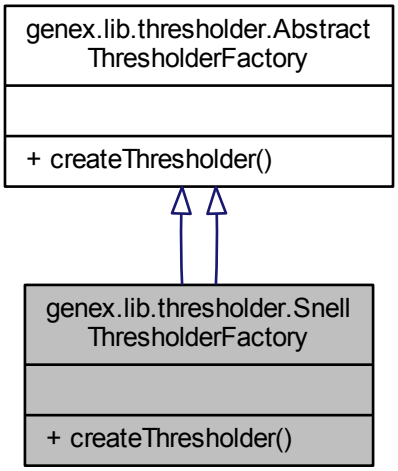
6.43.4.2 final double genex.lib.thresholder.SnellThresholder.maxCirc [package]

The documentation for this class was generated from the following file:

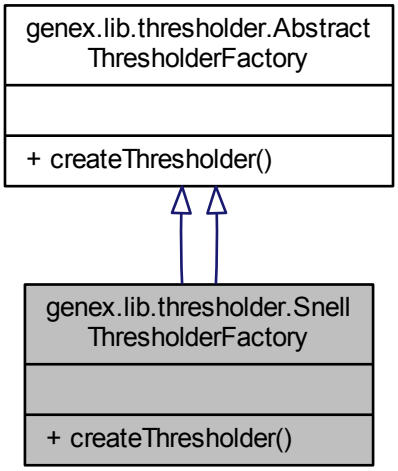
- src/genex/lib/thresholder/SnellThresholder.java

6.44 genex.lib.thresholder.SnellThresholderFactory Class Reference

Inheritance diagram for genex.lib.thresholder.SnellThresholderFactory:



Collaboration diagram for genex.lib.thresholder.SnellThresholderFactory:



Public Member Functions

- Thresholder createThresholder ()

6.44.1 Detailed Description

Snell thresholder factory

Author

J. Schier

6.44.2 Member Function Documentation

6.44.2.1 Thresholder genex.lib.thresholder.SnellThresholderFactory.createThresholder ( )

Create thresholder instance

Returns

Thresholder

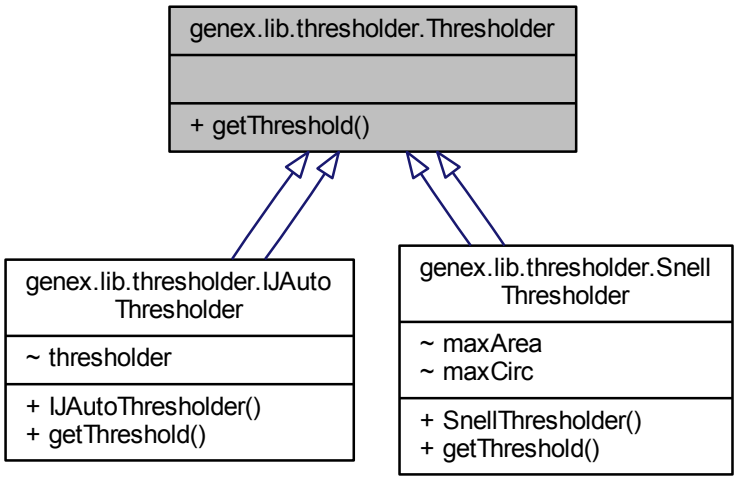
Implements genex.lib.thresholder.AbstractThresholderFactory.

The documentation for this class was generated from the following file:

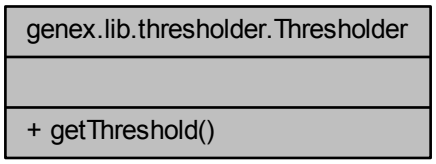
- src/genex/lib/thresholder/SnellThresholderFactory.java

6.45 genex.lib.thresholder.Thresholder Interface Reference

Inheritance diagram for genex.lib.thresholder.Thresholder:



Collaboration diagram for genex.lib.thresholder.Thresholder:



Public Member Functions

- int[] getThreshold (ImagePlus img)

6.45.1 Detailed Description

Author

J. Schier

6.45.2 Member Function Documentation

6.45.2.1 int [] genex.lib.thresholder.Thresholder.getThreshold (ImagePlus *img*)

get image threshold

Parameters

img	input image (contains stack of 1 or more images)

Returns

array of thresholds

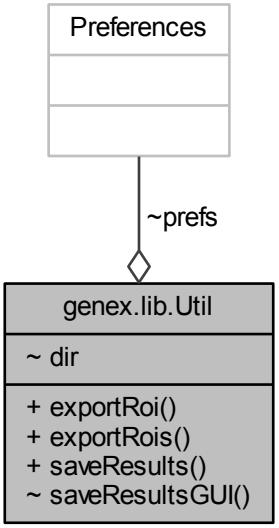
Implemented in genex.lib.thresholder.SnellThresholder, and genex.lib.thresholder.IJAutoThresholder.

The documentation for this interface was generated from the following file:

- src/genex/lib/thresholder/Thresholder.java

6.46 genex.lib.Util Class Reference

Collaboration diagram for genex.lib.Util:



Public Member Functions

- void exportRoi (ExtRoi extRoi, String channel, BufferedWriter writer)
- void exportRois (ArrayList< ExtRoi > rois, HashMap< ChannelNames, String > channelMap, String filename)
- void saveResults (FISHdata data, String descriptor, Boolean exportRoi)

Package Functions

- void saveResultsGUI (FISHdata dapiData, FISHdata sigData)

Package Attributes

- final Preferences prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)
- String dir = prefs.get(ParamDefines.CSV_DIR, prefs.get(ParamDefines.LAST_INPUT_DIR, ""))

6.46.1 Detailed Description

Helper methods for saving object parameters and ROIs to disk files

Author

J. Schier, B. Kovář

6.46.2 Member Function Documentation

6.46.2.1 void genex.lib.Util.exportRoi (ExtRoi *extRoi,* String *channel,* BufferedWriter *writer*)

Export rois to a text file. Takes extended rois and extracts the coordinates of the polygon rois http://imagej.nih.↩ gov/ij/developer/api/ij/gui/PolygonRoi.html

Each record in the text file consists of the roi name, roi id number, channel name (String), number of vertices, and their x and y cordinates in format x1, y1, x2, y2, ..

Parameters

extRoi	input extended rois ExtRoi
channel	channel identification string
writer	file writer

Here is the call graph for this function:

6.46.2.2 void genex.lib.Util.exportRois (ArrayList< ExtRoi > *rois,* HashMap< ChannelNames, String > *channelMap,* String *filename*)

Export rois to a text file. Takes extended rois and extracts the coordinates of the polygon rois http://imagej.nih.↩ gov/ij/developer/api/ij/gui/PolygonRoi.html

Each record in the text file consists of the roi name, roi id number, channel name, number of vertices, and their x and y cordinates in format x1, y1, x2, y2, .. The channel name in the string form is obtained from the channelMap parameter using the channel ID stored in extended roi

Parameters

rois	list of rois (linkExtRoi)@paramchannelMapmappingbetweenchannelidsandstrings@paramfilenameoutputfiletou

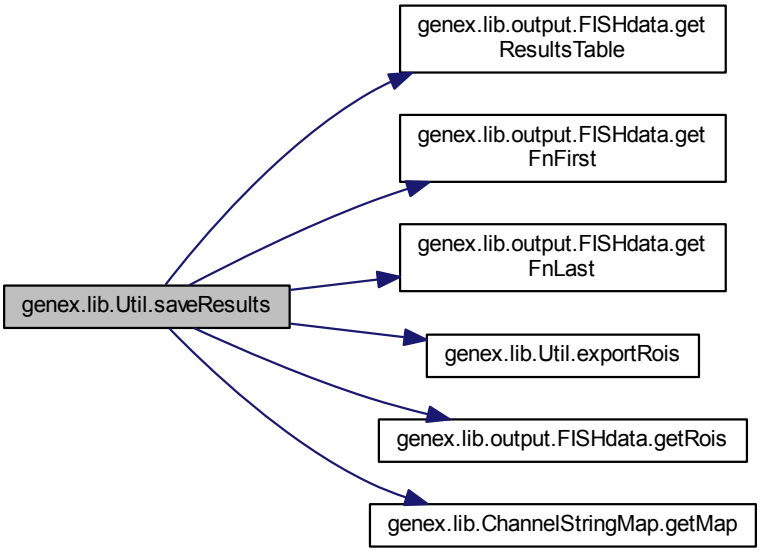
6.46.2.3 void genex.lib.Util.saveResults (FISHdata *data,* String *descriptor,* Boolean *exportRoi*)

Save results and rois to a CSV-file to a directory set in ParamDefines.CSV_DIR. If both fnFirst and fnLast are identical, the data is saved to fn-[dapi|signal].csv, else to fnFirst-fnLast-[dapi|signal].csv

Parameters

data	FISHdata results table and rois
descriptor	String - additional description, e.g. "dapi", "signals"
exportRoi	boolean - save roi?

Here is the call graph for this function:



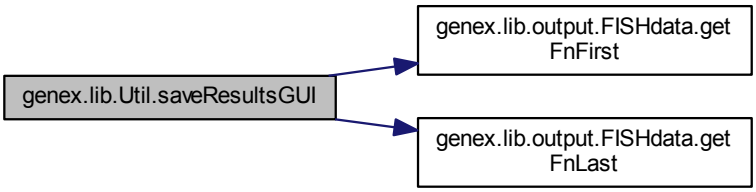
6.46.2.4 void genex.lib.Util.saveResultsGUI (FISHdata *dapiData,* FISHdata *sigData*) [package]

Helper method to save results table presents directory selection window, constructs file path and calls saveAs() method for writing the table to the disk.

Parameters

dapiData	helper object with results table and extrois, dapi channel
sigData	helper object with results table and extrois, dapi channel

Here is the call graph for this function:



6.46.3 Member Data Documentation

6.46.3.1 String genex.lib.Util.dir = prefs.get(ParamDefines.CSV_DIR, prefs.get(ParamDefines.LAST_INPUT_DIR, ""))

[package]

6.46.3.2 final Preferences genex.lib.Util.prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)

[package]

The documentation for this class was generated from the following file:

- src/genex/lib/Util.java

Chapter 7

File Documentation

7.1 src/genex/DapiProcessor.java File Reference

Classes

- class genex.DapiProcessor

Packages

- package genex

7.2 src/genex/GenexIterator.java File Reference

Classes

- class genex.GenexIterator

Packages

- package genex

7.3 src/genex/GenexPipeline.java File Reference

Classes

- class genex.GenexPipeline

Packages

- package genex

7.4 src/genex/lib/Channel.java File Reference

Classes

- class genex.lib.Channel

  Single channel representation.

Packages

- package genex.lib

7.5 src/genex/lib/ChannelStringMap.java File Reference

Classes

- class genex.lib.ChannelStringMap

Packages

- package genex.lib

7.6 src/genex/lib/Dapi.java File Reference

Classes

- class genex.lib.Dapi

Packages

- package genex.lib

7.7 src/genex/lib/ExtRoi.java File Reference

Classes

- class genex.lib.ExtRoi

Packages

- package genex.lib

7.8 src/genex/lib/filter/AbstractFilterFactory.java File Reference

Classes

- interface genex.lib.filter.AbstractFilterFactory

Packages

- package genex.lib.filter

7.9 src/genex/lib/filter/AreaCircFilter.java File Reference

Classes

- class genex.lib.filter.AreaCircFilter

Packages

- package genex.lib.filter

7.10 src/genex/lib/filter/AreaCircFilterFactory.java File Reference

Classes

- class genex.lib.filter.AreaCircFilterFactory

Packages

- package genex.lib.filter

7.11 src/genex/lib/filter/Filter.java File Reference

Classes

- interface genex.lib.filter.Filter

Packages

- package genex.lib.filter

7.12 src/genex/lib/GenExDefines.java File Reference

Classes

- class genex.lib.GenExDefines
- enum genex.lib.GenExDefines.ChannelNames
- enum genex.lib.GenExDefines.Filters

Packages

- package genex.lib

7.13 src/genex/lib/GraphicsUtils.java File Reference

Classes

- class genex.lib.GraphicsUtils

Packages

- package genex.lib

7.14 src/genex/lib/i18n/GenExBundle.java File Reference

Classes

- class genex.lib.i18n.GenExBundle

Packages

- package genex.lib.i18n

7.15 src/genex/lib/i18n/GenExBundle_cs_CZ.java File Reference

Classes

- class genex.lib.i18n.GenExBundle_cs_CZ

Packages

- package genex.lib.i18n

7.16 src/genex/lib/i18n/GenExBundle_en_US.java File Reference

Classes

- class genex.lib.i18n.GenExBundle_en_US

Packages

- package genex.lib.i18n

7.17 src/genex/lib/imagereader/FileImgReader.java File Reference

Classes

- class genex.lib.imagereader.FileImgReader

Packages

- package genex.lib.imagereader

7.18 src/genex/lib/imagereader/ImageReader.java File Reference

Classes

- interface genex.lib.imagereader.ImageReader

Packages

- package genex.lib.imagereader

7.19 src/genex/lib/imagereader/RGButils.java File Reference

Classes

- class genex.lib.imagereader.RGButils

Packages

- package genex.lib.imagereader

7.20 src/genex/lib/imagereader/ScreenImgReader.java File Reference

Classes

- class genex.lib.imagereader.ScreenImgReader

Packages

- package genex.lib.imagereader

7.21 src/genex/lib/ObjectFilter.java File Reference

Classes

- class genex.lib.ObjectFilter

Packages

- package genex.lib

7.22 src/genex/lib/output/FISHdata.java File Reference

Classes

- class genex.lib.output.FISHdata

Packages

- package genex.lib.output

7.23 src/genex/lib/output/Results.java File Reference

Classes

- class genex.lib.output.Results

Packages

- package genex.lib.output

7.24 src/genex/lib/params/ChannelInfo.java File Reference

Classes

- class genex.lib.params.ChannelInfo

Packages

- package genex.lib.params

7.25 src/genex/lib/params/ImageDirInfo.java File Reference

Classes

- class genex.lib.params.ImageDirInfo

Packages

- package genex.lib.params

7.26 src/genex/lib/params/InputGuiMain.java File Reference

Classes

- class genex.lib.params.InputGuiMain

Packages

- package genex.lib.params

7.27 src/genex/lib/params/InputGuiUtils.java File Reference

Classes

- class genex.lib.params.InputGuiUtils

Packages

- package genex.lib.params

7.28 src/genex/lib/params/ParamDefines.java File Reference

Classes

- class genex.lib.params.ParamDefines

Packages

- package genex.lib.params

7.29 src/genex/lib/RoiLabeler.java File Reference

Classes

- class genex.lib.RoiLabeler

Packages

- package genex.lib

7.30 src/genex/lib/Segmenation.java File Reference

Classes

- class genex.lib.Segmenation

Packages

- package genex.lib

7.31 src/genex/lib/SigChannel.java File Reference

Classes

- class genex.lib.SigChannel

  Channel-specific methods for hybridization signals, extends the Channel class.

Packages

- package genex.lib

7.32 src/genex/lib/SignalRoi.java File Reference

Classes

- class genex.lib.SignalRoi

Packages

- package genex.lib

7.33 src/genex/lib/SignalStats.java File Reference

Classes

- class genex.lib.SignalStats

Packages

- package genex.lib

7.34 src/genex/lib/thresholder/AbstractThresholderFactory.java File Reference

Classes

- interface genex.lib.thresholder.AbstractThresholderFactory

Packages

- package genex.lib.thresholder

7.35 src/genex/lib/thresholder/CSVWriter.java File Reference

Classes

- class genex.lib.thresholder.CSVWriter

Packages

- package genex.lib.thresholder

7.36 src/genex/lib/thresholder/IJAutoThresholder.java File Reference

Classes

- class genex.lib.thresholder.IJAutoThresholder

Packages

- package genex.lib.thresholder

7.37 src/genex/lib/thresholder/IJAutoThresholderFactory.java File Reference

Classes

- class genex.lib.thresholder.IJAutoThresholderFactory

Packages

- package genex.lib.thresholder

7.38 src/genex/lib/thresholder/SnellThresholder.java File Reference

Classes

- class genex.lib.thresholder.SnellThresholder

  Implementation of Violet Snell segmentation.

Packages

- package genex.lib.thresholder

7.39 src/genex/lib/thresholder/SnellThresholderFactory.java File Reference

Classes

- class genex.lib.thresholder.SnellThresholderFactory

Packages

- package genex.lib.thresholder

7.40 src/genex/lib/thresholder/Thresholder.java File Reference

Classes

- interface genex.lib.thresholder.Thresholder

Packages

- package genex.lib.thresholder

7.41 src/genex/lib/Util.java File Reference

Classes

- class genex.lib.Util

Packages

- package genex.lib

7.42 src/genex/SignalProcessor.java File Reference

Classes

- class genex.SignalProcessor

Packages

- package genex

7.43 src/GenExParams_.java File Reference

Classes

- class GenExParams_

7.44 src/GenExPlugin_.java File Reference

Classes

- class GenExPlugin_

  Plugin entry class.

Index