Experience Roadmap

1. Plugin Development

The programming of simple routines in Java.
Open the package with pointwise.zip plugins and images.
Easy access to image pixels: ImageAccess class.

Name	Description	Example
ImageAccess(nx, ny)	Constructor: Creates a Image of size [nx,ny]	`ImageAccess im = new ImageAccess (nx, ny);`
getPixel(x, y)	Returns the value of the pixel in the position (x, y)	`value = im.getPixel(x, y);`
putPixel(x, y, value)	Assigns value to the pixel at (x, y)	`im.putPixel(x, y, value);`
getWidth() getHeight()	Returns the width of a image Returns the height of an image	`int nx = im.getWidth(); int ny = im.getHeight();`
getMaximum()	Returns the maximum of an image	`double max = im.getMaximum();`
getMinimum()	Returns the minimum of an image	`double min = im.getMinimum();`

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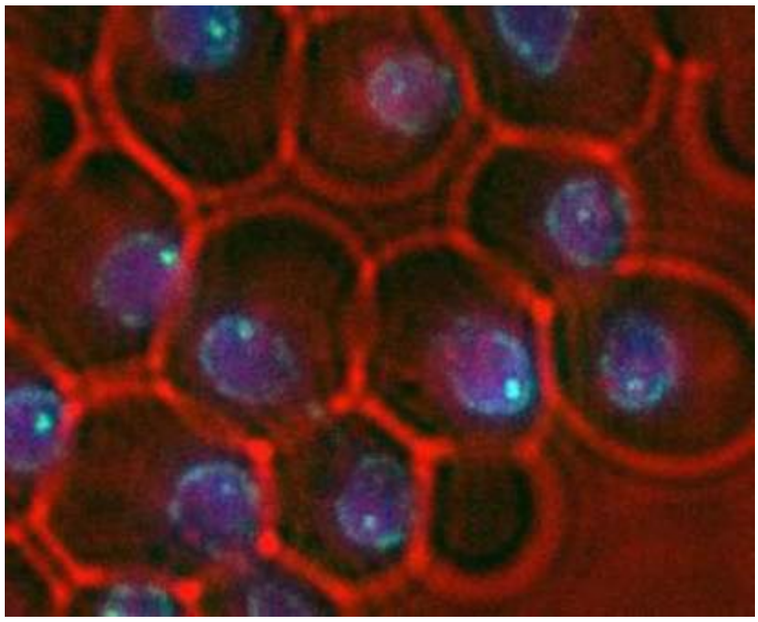
1. The point transformation to improve visualization.

1.1. Understanding: contrast inversion.

Understand the inverse() routine, it changes the pixel values of the image f(x, y) to g (x, y) = 255 - f (x, y).

Apply the routine to the image microtubules.tif calling the plugin "Inverse".
Look at the histogram.

1.2. Stretching and normalizing contrast.



Write the rescale() routine that changes the pixel value of the image f(x, y) to:

$g(x,y) = \alpha (f(x,y) - \beta)$

$\beta = \min(f(x,y))$

$\alpha = 255 / (\max(f(x,y)) - \min(f(x,y)))$

Reescalone g (x, y) a [0,255].

Apply the routine to the image of microtubules.tif calling the "Rescale" plugin. Look at the histogram.

1.3. Application: Saturates a medical image.

Write the saturate() routine that puts pixels to 10000 when the input value is greater than 10000. So call the routine rescale().

Apply the routine in HRCT.tif calling the plugin "Saturate". Look at the histogram.

2. Threshold segmentation: "thresholding".

2.1 Contando partículas.

Using the "Threshold" command of ImageJ, you try to segment the images: yeast1, yeast2, yeast3, and yeast4 to get 25 objects in the ImageJ particle analyzer (Analyzes -> Analyzes Particles). If you can't find a suitable threshold, explain why in the report file.doc.

3. "Z-Stack" projection.

3.1. Maximum intensity projection.

Write the zprojectMaximum() routine that generates the maximum intensity projection image of an image stack.

Apply the routine to the yeard_stack. tif by calling the ZMIP plugin.

3.2. Projection of mean intensity.

Write the zprojectMean() routine that generates the average image from a stack of images.

Apply the routine to the yeard_stack.tif by calling the ZMean plugin.

3.3. Presentation of z-stack images.

Use two plugins beforehand, the command "Brightness + Contrast", the command "Image Calculator" → "Color Merge" of ImageJ in an attempt to obtain a composite image of color where we can clearly distinguish the yeast cell, the GFP-tagged nucleus and the GFP-tagged telomere (stain).
The source is a z-stack of fluorescent images called yeast_stack. tif and the phase image is yeast_phase. .tif. In the image above is an example of what we can expect. Place the resulting image in the report.doc file.