Cull Images

Purpose

To efficiently select images processed by DeMotion for montaging.

Revision History

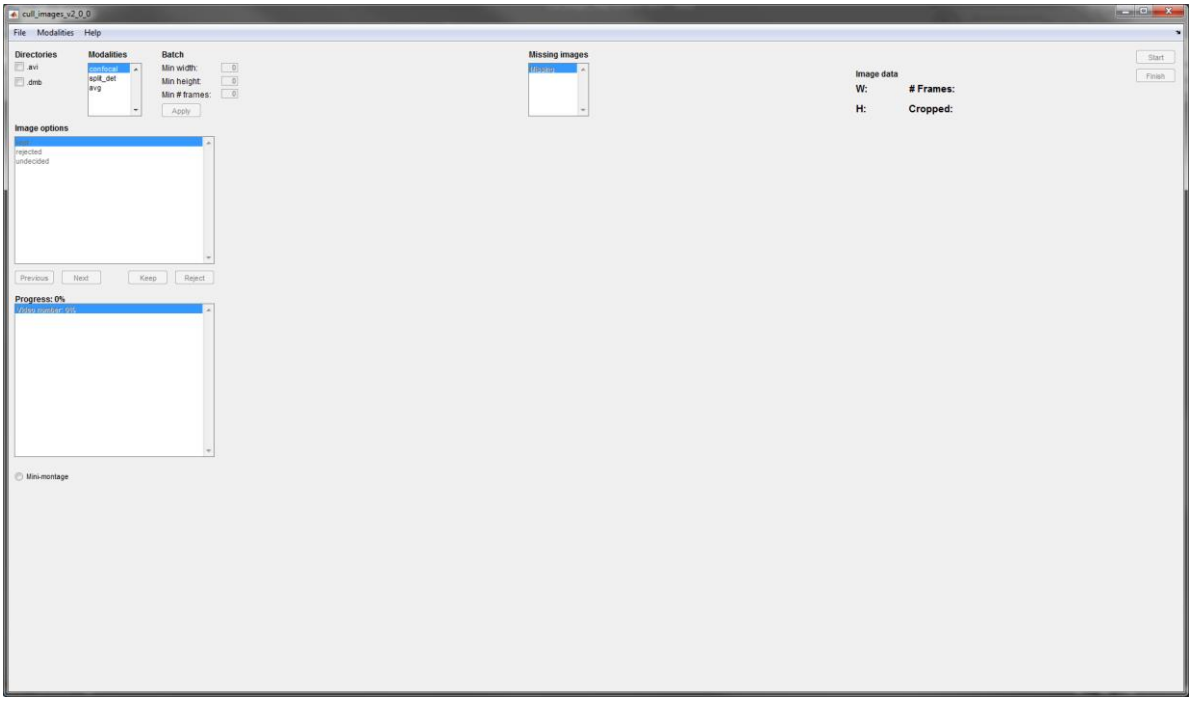
Version #	Date	Reason for Change:

2.0.0	2018.02.01	• New GUI
		• Image options displayed in a common scale
		• Automatic sorting of image options by registration method, size, and number of frames averaged
		• Automatic rejection of failed registrations
		• Image option selection visualization improved
		• Integration of stand-alone scripts:
		  ○ MissingImages – checks whether a video has a corresponding processed image
		  ○ Dat_Converter – converts .dat images to .tif images
		  ○ Delete_reg_tifs – batch rejection of images based on size and number of frames averaged
		• Wireframe visualization of image option alignment to facilitate montaging
		• Support simultaneous culling of strip-registered and full-frame-registered images
		• Output of .dmb files associated with kept images

Contents

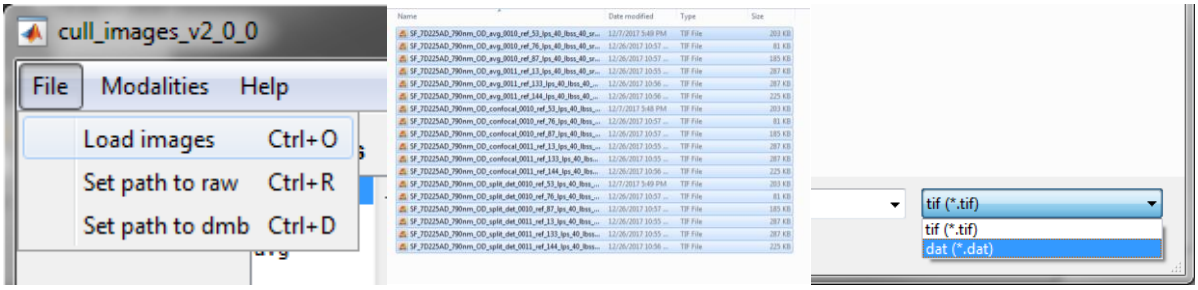
Instructions

Navigate to: \\aoip-server\Software-Hardware\AO_Tools\Processing\Cull_Images and run cull_images_v2_0_0.m. This window will appear:



1: Load Images

Ctrl+O, or File → Load images. Navigate to the directory containing processed images. Select the images you would like to load in. TIF and DAT files are supported, but TIF is the default. To find DAT files, select dat from the drop-down menu.



You may load more images, such as full-frame-registered images, provided they are from the same dataset. DAT files will take longer to load than TIF files, since the images must be opened to determine their dimensions.

2: Set paths to helpful files

Setting the path to your raw AVI or DMB files is not required, but it will activate a couple features of Cull_Images.

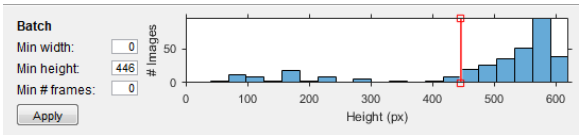
- Ctrl+R, or File → Set path to raw. Navigate to the directory containing the AVI files. When done, the checkbox next to ".avi" will be checked. This will allow the program to tell you which videos do not have an associated processed image, whether that is because it was not input,

or because all the options for that video have been rejected. This allows you to go back and reprocess those videos and re-input them.

- Ctrl+D, or File → Set path to dmb. Navigate to the directory containing the DMB files. When done, the checkbox next to ".dmb" will be checked. Inputting the DMB files will enable Cull_Images to save the DMB files associated with the kept images, which will greatly facilitate re-processing your dataset at a later date, if need be.

3: Batch culling

Once images have been loaded, the "height histogram" will be activated.

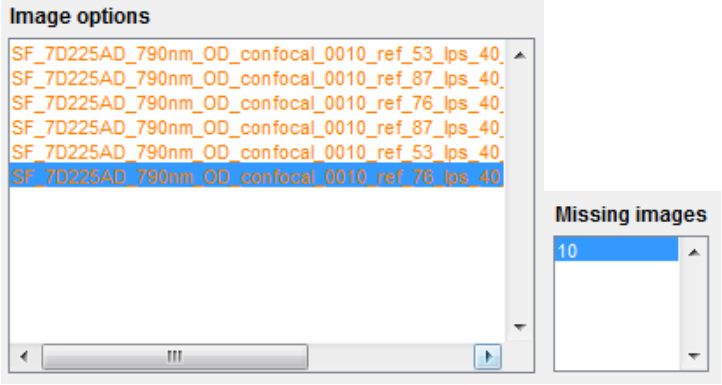


Since our AOSLO has a horizontal fast-scanning axis, DeMotion attempts to register images using horizontal strips. As such, when DeMotion fails, it is typically the height of the image that suffers. For this reason, only the distribution of image heights is shown. You can adjust the red slider to reject any image with a height below the line. You can also type threshold values into the "Min" boxes to reject images. Every time you hit "Apply", your previous decision will be overwritten, so you can relax or constrain your thresholds. Using the "Missing images" and "Progress" lists will be helpful in making a decision about your thresholds (see below).

Images with the label "cropped_1" will automatically be rejected, because this is usually a sign that registration failed, and images where the minimum overlap for cropping was set to 1 will have a black background, and will be awkward for montaging. This will occur even if you set all thresholds to 0, and hit "Apply". If you need to include images containing "cropped_1", consider skipping batch culling.

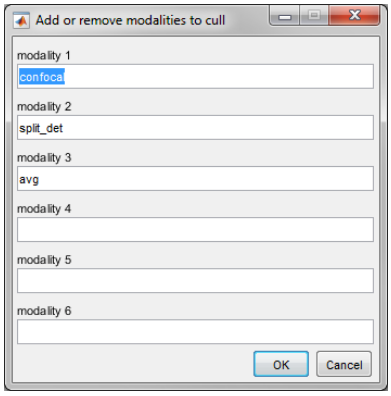
4: Missing Images

If you provided a path to your AVI files, "Missing images" will indicate which video numbers do not have an associated processed image, whether that is because they were not input or because they were all rejected. Keeping an eye on this list may be helpful in deciding thresholds for batch culling.



5: Set modality list

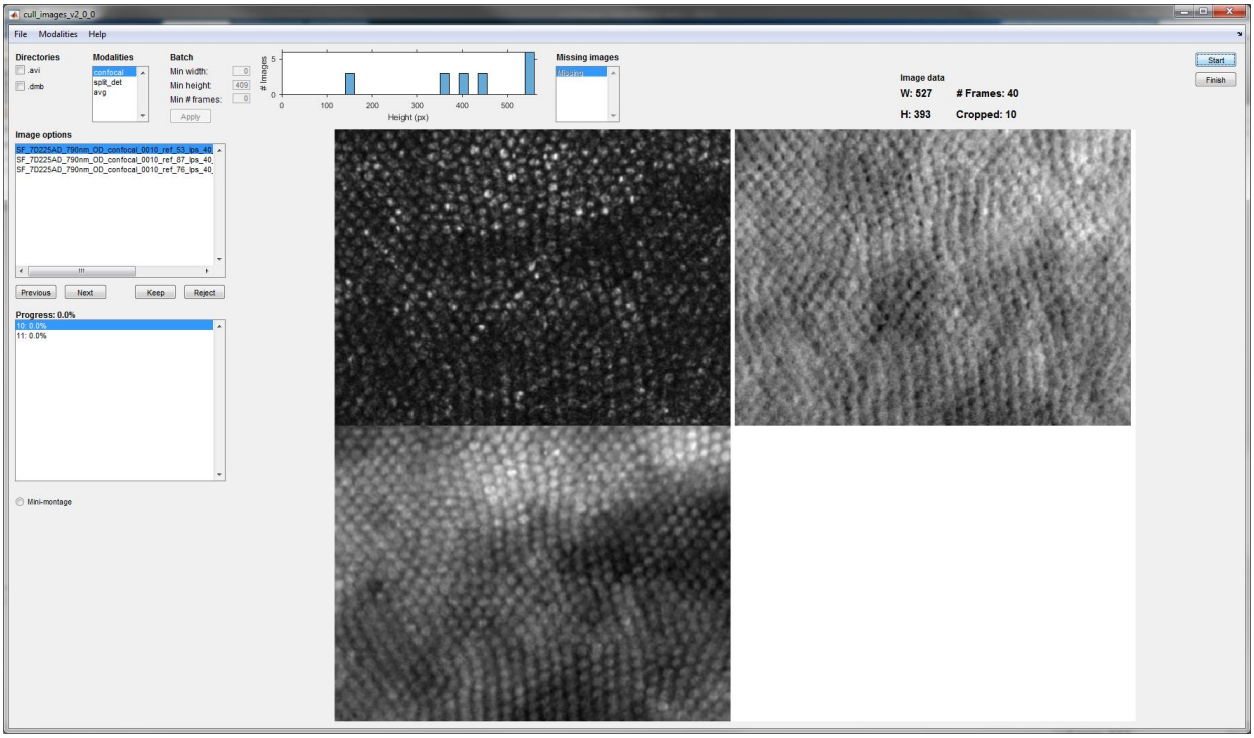
If your dataset includes modalities other than the standard confocal, split-detector, and dark-field, you will need to adjust the modality list. Ctrl+M, or Modalities → Edit.



If you have more than six modalities (good for you!), hit “OK” then open the edit menu again. There will be three more open slots, and so on.

6: Image culling

Once you are satisfied with batch culling, hit “Start”. You will not be able to do any more batch culling or adjust the modality list after this point. The first video with an undecided image will appear in the image space.



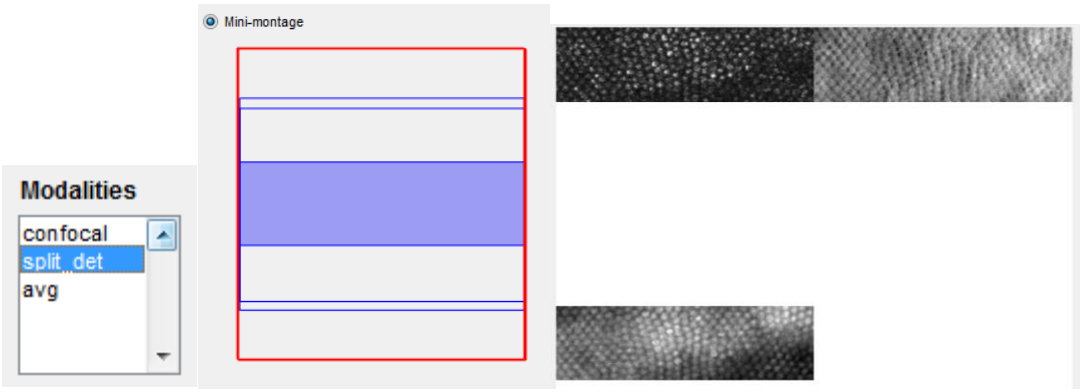
Use the arrow keys (↓↑), or click on the images in the “Image options” list to toggle between image options. To keep an image, use the right arrow key (→) or hit “Keep”. To reject and image, use the left arrow key (←), or hit “Reject”. If you make a mistake, you can overwrite your decision. In the “Image options” list, the font color for kept images will change to blue, and rejected images will change to orange. If you are currently interacting with the “Image options” list, the ↓↑ arrows will display rejected images, but if you are interacting with the window, they will skip rejected images, allowing you to rapidly make decisions about undecided images.

The image options will be automatically sorted by registration method (strip-registered first), then by size, then by number of frames averaged.

Use (N) or hit “Next” to advance to the next video. This will skip videos for which a decision has been made for all image options. Use (P) or hit “Previous” to go back to the previous video. This will not skip any videos, so if you made a mistake, you can return to any video.

7: Mini-Montage

Click the “Mini-montage” radio button to activate the mini-montage. This attempts to compute an alignment between your processed images and display their outlines. Strip-registered and full-frame-registered images will have a blue and red border, respectively. Undecided, kept, and rejected images will have a solid, bold, or dashed border, respectively. The current image will be shaded blue. Your selection in the “Modality” list will be used as the template modality for registration.



In this example, the split-detector was used as the template modality for registration, and the current image is much shorter than the other image options. You may see warnings in the Matlab command window, such as “Warning: Registration failed because optimization diverged. Try reducing the MaximumStepLength property of the RegularStepGradientDescentOptimizer optimizer.” This means that the positions of the outlines in the mini-montage are not accurate. This will be improved in a future release.

8: Finish

When you have kept all the images you want, hit “Finish”. Navigate to the directory where you would like to store your images (probably in an automontaging input directory). If you provided the path to DMB files, it will copy the DMB files associated with your kept images into a subfolder in your output directory. If your kept images are DAT files, this step may take some time, as it must read and write the images as TIF files. Only kept images will be saved, undecided images are considered rejected.