

Phys/Comp 510 Advanced Image Analysis

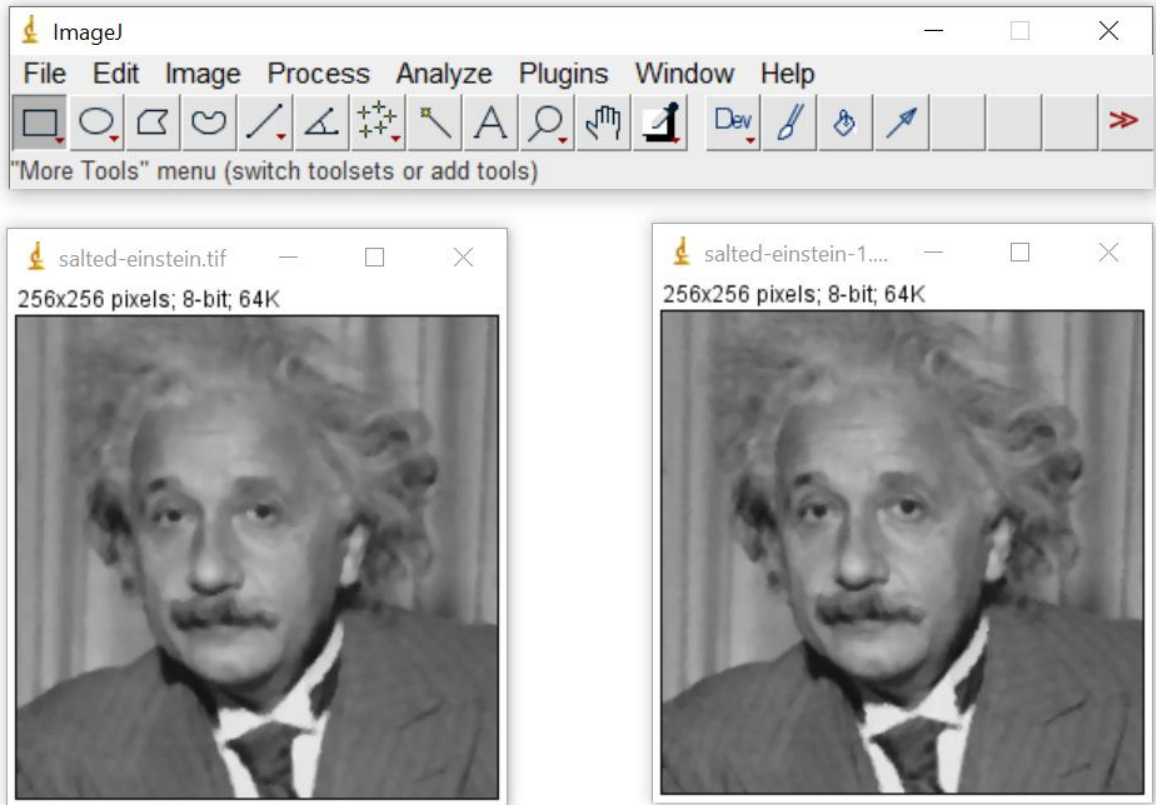
HW#4B

Exercise 2-3 — Iterated vs. large support median filter

In exercise 2-2 question (2), the choice of which median filtered image is the better can only be subjective as we do not have the original image. By taking a similar image without noise and adding the same type of noise we can experiment with different noise reduction filters and objectively determine which is best for that image. We can let the result guide our choice of filtering for the image for which we only have the noisy version.

(1) Load the image salted-einstein.tif (contained in the session ZIP file). Duplicate it to have two identical images.

In one window, apply the median filter with radius 2 pixels. In the other window, apply the median filter twice in succession with radius 1 pixel. Keep track of which is which – you may want to use Image, Rename... to give them descriptive names.

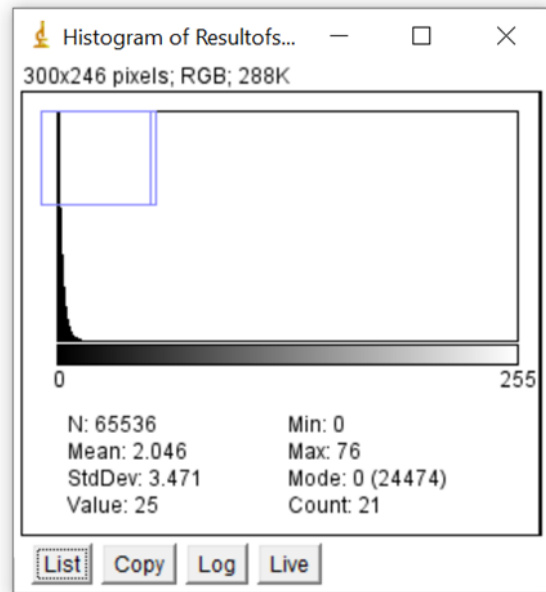
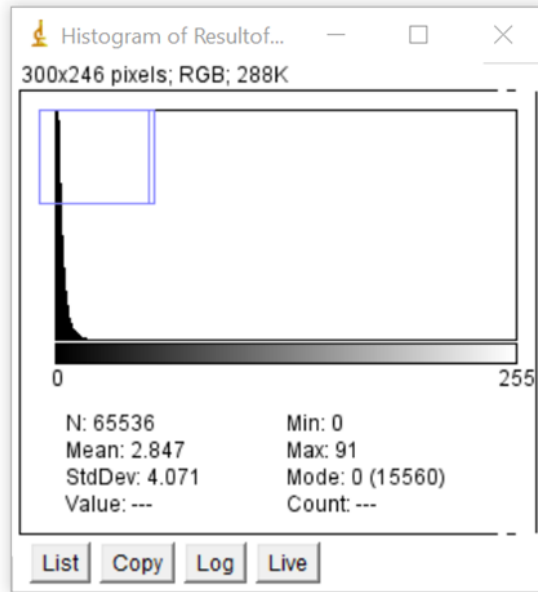


(2) Now load the original image `einstein.tif` (contained in the session ZIP file). You shall now determine which of the two processed versions is closest to the original.

Use the image calculator to compute difference images. Choose `Process, Image Calculator...` from the menu and choose `Difference` as the operation to perform (this will calculate the absolute value of the difference, pixel for pixel). Choose one of the processed images as the first image and the original as the second. Check `Create New Window` but do not check `32-bit Result`.

Repeat for the other processed image to produce a second difference image.

Determine by examining the histogram windows for the two difference images which filtered image is closest to the original. Explain how you reach your conclusion.



(3) Propose how one can in a similar fashion examine if there is any bias (systematic deviation) in pixel values between the original and a filtered image.

Exercise 2-5 — Background subtraction / normalization (II)

Open the image `imagelight.tif` (from the session ZIP file). Propose and apply an algorithm based on background subtraction / normalization to make the image suitable for thresholding into two parts: letters and background.

