

**GP/EE60Q – Man vs. Nature: Coping with Disaster Using Space Technology
Fall 2006**

Handout 11

Lab exercise #2

1. Turn on the computer monitor and log in using your Leland ID and password.
2. If Scion Image is already installed, start Scion Image by going to the 'Start Menu', and selecting 'Scion Image' under 'Programs'. Otherwise download it from the Software tab on the course web page.

Topic 1: Resolution

3. Download the "Ex2.zip" directory from the Homework tab on the class web page. Put the file on your desktop and unzip it.
4. Select 'Import' under the 'File' menu on the Scion Image program.
5. Click on the 'Custom' button, and then press 'Set'. Set the 'width' and 'height' entries to 256, since the images for the next two items are 256 x 256 pixels. Click 'OK'.
6. Select the 'invert' option. (Click on the appropriate box in the lower left of the selection window).
7. Open the file named "point" in the Ex. 2 directory. The image will open, and will be all white with a tiny black dot in the center. Using the magnifying glass tool, zoom in on the dot (just click on the dot- no need to outline an area to zoom) until the window title is "point (8:1)". The dot should now be easy to see.
8. Under the 'process' menu, select 'convolve'. Open the 'kernels' directory within the 'Ex. 2' directory. Select the file called "Mean3x3.txt".
9. Examine the resulting box visible in the output. What can you say about its brightness and size in relation to the original image?
10. Close "point" and open "points". Keep sizes set to 256.
11. You should see three pairs of circles, each 16 pixels in diameter, separated by 1, 1.5, and 2 diameters.
12. Again select 'convolve' in the 'process' menu. This time use the file "Mean16x16.txt".
13. The image will now be blurred such that it is difficult to separate the dot pairs. Which pair(s) are now separable?
14. Close "points" and open "Stanford.small".

15. Click once on the image with the zoom (magnifying glass) tool, so that the window title becomes "Stanford.small(2:1)".

16. Can you identify The Oval? The stadium?

17. Filter (convolve) with a 3x3 mean window. Can you see the features now?

18. Filter (convolve) with a 5x5 mean window. How's the image looking now?

19. Close "Stanford.small".

Topic 2: Contrast and Image Stretching

20. From the 'File' menu, select 'Import', then 'Custom', then 'Set', and change width and height to 1024. Make sure that 'Invert' is still checked. Open "Stanford.1024". You should see a washed out image of the Stanford area.

21. We will now plot a couple of histograms. Using the tool whose icon is a dashed box, draw a box in the middle of the bay.

22. In the 'Analyze' menu, select 'Show Histogram'. A histogram box will appear. Putting the cursor in this box allows you to see the number of points ('count') at a given brightness level ('level'). These values are displayed in the 'info' box.

23. What is the range of levels for the water?

24. Now make a box containing both light and dark areas. Make another histogram, and note the range of 'level' values.

27. We will improve the readability of the image by "stretching" it. Close the Scion Image window.

28. Open the program "linearstretch", which is in the 'Ex. 2' directory.

29. Inputs:

file name: Stanford.1024

file line length: 1024

output file name: stretch

low and high values: 60 110

You will see the program run. It is done when the window closes.

30. Start Scion Image. Import "stretch" with custom width and height set to 1024, and inverted.

31. You should now see the same image, but with increased contrast. Use the histogram plots to convince yourself that the image has indeed been stretched (and to see what we mean by "stretching").

32. Close Scion Image, and log yourself out of the computer.