

Programming Assignment 2
CS 111: Digital Image Processing (Spring 2009)
Due: May 5, 2009 (Thursday)

Low-pass Filtering

Write a program to generate an 8 level Gaussian pyramid using convolution. Use two different approaches to generate the pyramid.

- A. Generate each level of the pyramid by applying a 2x2 box filter to the image in the immediately preceding level.
- B. Generate each level of the pyramid by doubling the size of the box filter and applying it to the original image, which forms the first level of the pyramid.

Compare the results generated from these two approaches.

Band-pass Filtering

Write a program to generate 7 levels of the Laplacian pyramid by subtracting the consecutive levels of the Gaussian pyramid.

Edge Crispening

Photographs with crisper edges are often subjectively pleasing than exact photometric representation. One way to achieve edge crispening is to apply high pass filtering to an image and adding the high frequency image to the original image. Use the following two approaches for high-pass filtering the image.

- A. Subtract every level of the Gaussian pyramid from level 1 and get 7 levels of high-pass filtered images.
- B. Apply the following high-pass filters successively to generate a high-pass filter pyramid (similar to the approach A for generating the Gaussian pyramid).

-1	-1	-1
-1	8	-1
-1	-1	-1

Generate a pyramid of edge sharpened images by adding the original image to each image in the hierarchy. Compare the two different image hierarchies thus generated and justify your results. For more information check http://www.dfanning.com/ip_tips/sharpen.html