

CS 111: Digital Image Processing (Spring 2009)
Programming Assignment 1

Due: April 14, 2009

Getting Started

- 1) In this course we will read and write images. You may download and use “MyImageReader.java” and “MyImageWriter.java” for this purpose. You may find them here:
<http://www.ics.uci.edu/~hpirsiav/cs111/MyImageReader.java>
<http://www.ics.uci.edu/~hpirsiav/cs111/MyImageWriter.java>
- 2) Download images from the course website to create your own image gallery. You will be using these images to test your code throughout this class.
- 3) Write a code to test if you can read and write files in jpg format.
- 4) If you want to use Java, look for Java applet for reading and writing images. We will mostly using JPG images.
- 5) It is important to have a good image viewer. A popular one is Irfanview – Google it and download. It is free.

Setting Up for Convolution

Write a program that implements the function *Convolve(I, F, iw, ih, fw, fh)* with the following specifications.

- a. *I* is a gray scale image. This is a two dimensional array of size *iw* by *ih*.
- b. *F* denotes a filter. This is a two dimensional array of floating point numbers of size *fw* by *fh*. Usually $(fh, fw) \ll (ih, iw)$.
- c. The output *O*(*x*, *y*) is an image of same size as *I*. The value of *O* at any pixel is generated by position *F* on *I*(*x*, *y*) such that the top right pixel of *F* coincides with *I*(*x*, *y*), and then multiplying the values of *I* and *F* for all the pixels of *I* covered by *F*, and finally summing these values.
- d. Test your code on some of the images using the following two filters.

1/4	1/4
1/4	1/4

1/9	1/9	1/9
1/9	1/9	1/9
1/9	1/9	1/9

Note: Consider the pixels around the boundary of *I* to be of value 0.