Marmara University

Electrical and-Electronics Engineering

EE7025-Fundamentals of Digital Image Processing

Project 1

Due: 4 October 2017

1. Write a computer program capable of reducing the number of intensity levels in a image from 256 to 2, in integer powers of 2. The desired number of intensity levels needs to be a variable input to your program. Apply your program to Figure 2.21(a) and duplicate the results shown in Figure 2.21 of the book.
2. Write a computer program capable of zooming and shrinking an image by pixel replication. Assume that the desired zoom/shrink factors are integers. Apply your program to Figure 2.21(a) to shrink the image by a factor of 10. Use your program to zoom the image in back to the resolution of the original. Explain the reasons for their differences.
3. Repeat 2 by using bilinear and bicubic interpolations.
4. Write a computer program to implement affine transformation via inverse mapping. Apply your program to Figure 2.36(a) for the following affine transforms and show the output images in each case (Hint: the first matrix rotates the image by 30 degrees, the second matrix shrinks the image by a factor of 2, and the last matrix shifts the image 15 pixels and 20 pixels in the horizontal and vertical directions, respectively).

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1. Write a program to implement image registration. The inputs to your program are the original and distorted images, and the suitably chosen 4 reference point pairs in these images. The outputs of your program should be the transformation parameters given by , the registered image and the difference image between the original and the registered images. Apply horizontal shearing to Figure 2.37(a) to get a distorted image by selecting an appropriate value for the parameter in the horizontal shearing. Use your registration program to get the registered and the difference images.