UCLA

Department of Computer and Electrical Engineering

EE211A Digital Image Processing

Winter 2018

Homework 1 (Deadline: 01/29/2018 6 pm)

Preliminaries

- The image file referenced in this homework (test image) can be accessed from class website:
  https://ccle.ucla.edu/mod/resource/view.php?id=1838061
- Please upload your homework (.pdf file) to CCLE by Monday 01/29/2018 6 pm
- There are no restrictions about the programming language you can use in this homework. The homework can be done using any programming language (MATLAB, Python, …)
- Please include the code, images and your observations in your report

Problem 1

Implement your own function that performs a convolution operation between a grayscale image and a filter.

a) Using your convolution function, filter the test image with Sobel filter. Explain your observations.
b) Using your convolution function, filter the test image with Gaussian filter for three different σ (σ = 1, σ=5, σ=15). Explain your observations.

Problem 2

Implement your own function that performs bilateral filtering to a grayscale image. Using your own function, perform bilateral filtering operation on the test image for the following σ_s and σ_r values. Explain your observations.

$\sigma_s = 3, \sigma_r = 0.1$	$\sigma_s = 3, \sigma_r = 0.3$	$\sigma_s = 3, \sigma_r = 10$
$\sigma_s = 10, \sigma_r = 0.1$	$\sigma_s = 10, \sigma_r = 0.3$	$\sigma_s = 10, \sigma_r = 10$
$\sigma_s = 25, \sigma_r = 0.1$	$\sigma_s = 25, \sigma_r = 0.3$	$\sigma_s = 25, \sigma_r = 10$