

EEE-6512 Image Processing and Computer Vision  
Fall 2017 Extra Credit #3  
December 4, 2017

**Due: December 13, 2017, 11:59 PM**

This assignment should be completed individually by the student. Late submissions will not be accepted. Proper citation should be provided for any references used.

**Part I Feature Detection [50 points]**

You are to write a function called *feature\_detect()* which accepts a grayscale image stored in a matrix as input and returns two separate pseudo-colored images. In the first output image, 5x5 blocks of pixels is colored green when a corner has been detected at the pixel center of the neighborhood using the Moravec Operator. In the second image, a 5x5 block of pixels is colored red when a corner has been detected at the pixel center of the neighborhood using the Harris Corner Detector. All non-corner pixels of the output images should be set to their gray-level in the input image. Prior to returning the images as output, the function would print the images to the screen. Note that you will use a 3x3 neighborhood to detect corners but color a 5x5 neighborhood to display them.

**Part II MATLAB Programming [50 points]**

You are to write a function *watershed\_immersion()* that takes a grayscale image stored in a matrix as input and returns a pseudo-color image that represents the segmentation of the input image using the watershed method with markers. The pixels on the contours of the segmented regions should be colored yellow whereas all other pixels of the output pixels should be set to their gray-level in the input image. Prior to returning the output image, the function should display the input image, the marker image, and the output image.

To receive full credit for this assignment, you should submit two files. 1.) An M-file containing commented MATLAB code for the *feature\_detect()* function. 2.) An M-file containing commented MATLAB code for the *watershed\_immersion()* function. Students should ensure that their M-files execute without errors to avoid receiving point deductions.