EEE-6512 Image Processing and Computer Vision
Fall 2017 Homework #3
September 21, 2017

Due: September 29, 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 Textbook Questions [50 points]

Answer the following questions from the textbook:

3-16, 3-17, 3-22, 3-23, 3-24(a), 3-25, 3-26, 3-31, 3-35, and 3-37

Part II MATLAB Programming [50 points]

Please read requirements carefully. Solutions that do not follow provided specifications will not receive credit.

- You are to create a function called *videosubsamp* which accepts two character strings, the first representing the file name of the input video and the second presenting the file name of the subsampled output video file. The function will also accept a third input argument *samp_rate* which is a scalar representing the sampling rate of the video (i.e., a value of 3 would mean the output video file consists of every third frame of the input video file). The function will return two scalar values; the first is the number of frames in the input video and the second the number of frames in the output video.
- You may use built-in MATLAB functions to read/write the video files. A video file in AVI format, *FroggerHighway.avi*, has been provided to test your function.
- You are to write a program *background_sub* which operates in the following manner:

formulas in textbook

    - Convert the first 100 frames of *FroggerHighway.avi* to grayscale using one of the conversion methods discussed in the text.
    - Using the converted frames, compute the average image as described in the text.
    - Display the average image.
    - Choose any ten frames from the grayscale *FroggerHighway.avi* and display the thresholded result of performing background subtraction on the ten frames using the average image. (You are free to choose the threshold value.)

To receive full credit for this assignment, you should submit three files. 1.) A document containing answers to the textbook questions and the thresholded background subtraction results (.DOC, .DOCX, or PDF file) 2.) An M-file containing commented MATLAB code for the function *videosubsamp*. 3.) An M-file containing commented MATLAB code for the program *background_sub*. Students should ensure that their M-files execute without errors to avoid receiving point deductions.