USC University of Southern California

USC Viterbi School of Engineering
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USC Viterbi School of Engineering
BME Department
BME 527: Integration of Medical Imaging Systems
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Instructions for all homework

- No more than 2 pages/Question.
- Please write neatly or type (preferred).
- Put your name and date of the assignment on each page.
- State the problem clearly, what are the assumptions, methods, results, and summary.
- ABSOLUTELY NO LATE HW ACCEPTED!

Homework 2

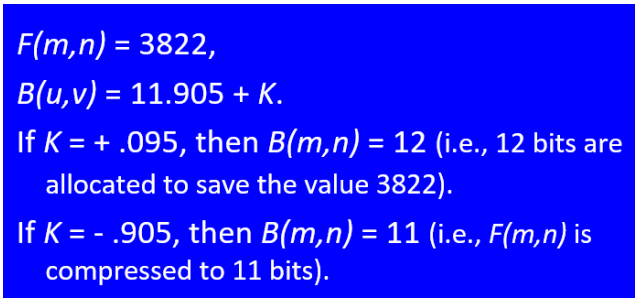
Due date: September 21st @ 5PM

Prerequisites:

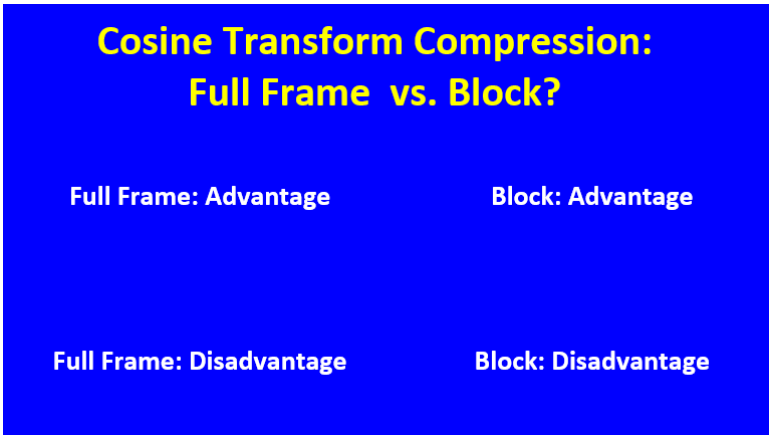
1. Read and understand the three methods of error–free compression.

Instructions:

1. According to Quantizing with Bit Allocation method. What is $F_q(u,v)$ in the Two Given Cases? (You can find these cases in the lecture slide). Note: you should list the equation you used and show the process of how you get to the result.



2. Please complete the table comparing Full Frame vs. Block cosine compression in the Lecture slide. Note: you should list the advantages & disadvantages of both methods.



3. In one page, please summarize the concept of image compression using the wavelet transformation. You may use any one slide we discussed in class for illustration, but please don't exceed one page (Please use 12-point font).

4. Find one image from your CT image data set. Perform the cosine transform on the image. Plot the result and comparing it with the Fourier transform. Please comment. You could submit your MATLAB/Python code (Not required but recommended). Note: you should paste the images on your homework and give comment of what you have seen (meaning for the image, relationship, difference). (Hint: you should consider the meaning of frequency domain (amplitude, phase, reconstruction) and relationship between Fourier transform and Cosine transform).
5. You should submit one .doc or .pdf file along with displayed and transformed images (Fourier & Cosine) through DEN.
6. The name of your homework should be like: HW2_name_studentID.pdf, Fourier_amplitude.jpg (.bmp .png .tiff), Fourier_shift.jpg (.bmp .png .tiff), Fourier_phase.jpg (.bmp .png .tiff), Phase_reconstruction.jpg (.bmp .png .tiff), etc.
7. If you prefer to submit the homework in person, you could write or print out and hand it in before the class.
8. If you are not satisfied with the initial grade, you can still have chance to regrade.