Digital Image Processing: Lab Assignment 4

#4: Image Compression [100points]

Issue date: 12-02-2020 Due date: -02-2020

Instructions

- Do not copy code from any other source (internet or friend). In case, any plagiarism detected, strictly zero mark will be assigned for that assignment.

- Show your results on sample images given in the assignment. Any other won't be considered for evaluation.

- Clearly state your name and Entry number on the lab report.

- Any additional materials used during the completion of the assignment must be cited. Failure to correctly reference sources will result in mark deduction(-10p/day).

- Submit a PDF file with proper. If the report is handed in more than three days after the deadline, the assignment will be marked zero marks. Up to fifty bonus points may be awarded to the student for very good lab assignments that comply with the criteria described below:

  +10p ← Report is clearly written and easy to follow.
  +10p ← Code is well documented.
  +10p ← Explanations and Observations are well written.
  +10p ← For overall exceptional reports, that confirm to all scientific writing standards.
  +10p ← Extra experiments performed on other set of images for better understanding.

Image Compression

1. Perform various compression methods and find the performance parameters like compression ratio/loss and mean square error (MSE) for each case. [40]
   (a) Bilinear
   (b) Bicubic
   (c) DCT
   (d) FFT (vary percentage of compression and do qualitative performance) Give the best compression %age which is acceptable.

   Compare the above methods and choose the best method with proper justification.

2. Implement the Seam carving method of image compression by removing the areas with low energy. Read the link in detail for better understanding. https://perso.crans.org/frenoy/matlab2012/seamcarving.pdf

   Find the best compressed image without losing much information in image. Also find the compression ratio and challenges for the method. [40]

3. Image compressing using 2-D Wavelet decomposition to an image as
   [LL, LH, HL, HH] = wavelet_Decomp(I)

   (i) Reconstruct the original image using decomposed components. [10]

   (ii) Further perform wavelet decomposition on LL component, to obtain 4 components.

   Show the reconstructed image using this 2nd level image and compare the loss in two cases. [10]