

Image Compression and Packet Video
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Laboratory Assignment #2
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Purpose:

This lab will further investigate the area of compression performance measurements. Lab #1 focused on objective measures of quality (mean square error in particular) This second lab will examine the problem of subjective measurement. There will be no MATLAB programming involved in this lab.

Problem:

Several test images have been loaded into the system. These are TIF files, (256x256x8 pixel) images that have been compressed and reconstructed using four different programs. and different ratios of compression. The lab project will display the images (every 2 seconds) in the following order:

- The original image (uncompressed)
- The image that you are evaluating
- The image that is considered a reference image - A reference image Is the standard that you will use to compare the other reconstructed image.

The evaluation image will be assigned a quality number. If the image is identical to the original image, it will be assigned a number value of 0. If it is identical to the reference image, it will receive a number of 10. If it is worse than the reference, it will receive a number higher than 10.

The evaluation method was used by the National Imagery Transmission Format Standards Technical Board during their Low Bit rate Coding Evaluation Study. During the study, trained photo-interpetors from Kodak were used to rank the images. This exercise will demonstrate how robust the method is when untrained observers perform the experiment.

The test images were created using the ISO JPEG software (for all reference images), The Aware Wavelet compression software, A fractal Compressor (From Roger Boss and Bill Jacobs (NRAD)) and a US Navy Compressor

Evaluate the following image:

Hawaii.tif (compressed and reconstructed at 16:1 and 32:1) - Collected using a Kodak DCS-200 Camera (extracted from the 1524x1012x8 image)

Langair.tif (compressed and reconstructed at 16:1 and 32:1) - Digitized from a TARPS photo (F-15 camera pod). Extracted from the 4Kx4Kx8 image.

Image Evaluation Matrix

Original Image	Test Image	Reference Image	Measured Score
hawaii.tif	hawf16.tif	hawj16.tif	
hawaii.tif	hawa16.tif	hawj16.tif	
hawaii.tif	hawr16.tif	hawj16.tif	
hawaii.tif	hawf32.tif	hawj32.tif	
hawaii.tif	hawa32.tif	hawj32.tif	
hawaii.tif	hawr32.tif	hawj32.tif	
langair.tif	langf16.tif	langj16.tif	
langair.tif	langa16.tif	langj16.tif	
langair.tif	langr16.tif	langj16.tif	
langair.tif	langf32.tif	langj32.tif	
langair.tif	langa32.tif	langj32.tif	
langair.tif	langr32.tif	langj32.tif	

After you have measured the subjective score, please record the computer you ran the test on, and the display monitor that you used. Please note the display settings (such as the display resolution and color levels (256 or more)). Note that this lab will not work well with 16 colors. Summarize the results in the table, and produce a ranking chart that compares the three compression methods against the two ratio's of compression. Please e-mail the results to Nicholas.Beser@jhuapl.edu, I will post them on the class web site. I prefer you use Microsoft Word formatted files, but flat text files will be accepted. Please do this part of the lab ASAP (within the next three weeks) so that the class has enough data to do the extra credit part.

Extra Credit: After you have collected your measures, get copies of the evaluation forms from the other students. Additional evaluation forms will be posted on the class web site from previous years evaluations. Perform a statistical analysis of the results to get the subjective evaluation. Compute a confidence number based on the class data. (You will have to consult a statistics book for the formulas, use MATLAB to compute the results and submit a listing with your ranking table.) (ANOVA F statistic is an example). You may also use an Excel spread sheet to compute the data. (use any statistics tool that you have available).