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Assignment #4  
4/1/2015  
  
dft.py  
  
 This program is used to create a discrete fourier transform and the inverse. An object is instantiated with the image path and an optional name which is appended to the output file name. The two main methods are then takeDFT and takeIDFT. TakeDFT takes no parameters, takeIDFT takes a tag that can be used to indicate whether both plots, just the phase, or just the power is to be used to reconstruct the image. Two 16 x 16 pixel images were used to account for the extremely long time it takes to run a DFT. Two images that were 256 x 256 were also used. Their plots are in the folder as well, but they were initially run with an error in the phase plot. Taking all the plots took around 4 hours (about 20-30 minutes per plot). Due to time constraints it was not possible to redo the plot in time for the report.

The DFT images are shown below. The FFT Discussion follows after the images.

C:\Users\John\ImageProcessing\Homework4\BWSkull.jpgC:\Users\John\ImageProcessing\Homework4\sword.png

The two images, a skull icon and a sword icon.

C:\Users\John\ImageProcessing\Homework4\elephantdftPower.jpgC:\Users\John\ImageProcessing\Homework4\elephantPhase.jpg

The Power Plot (Left) and Phase Plot (Right) of the Skull Image

C:\Users\John\ImageProcessing\Homework4\elephantidftImagenone.jpgC:\Users\John\ImageProcessing\Homework4\BWSkull.jpg

The Original Image(Right) And the IDFT Image(Left) of the skull icon. Some color and detail were lost.

C:\Users\John\ImageProcessing\Homework4\elephantidftImagephase.jpgC:\Users\John\ImageProcessing\Homework4\elephantidftImagepower.jpg

Reconstructing the image with just the Phase (Right) and Power(Left)

C:\Users\John\ImageProcessing\Homework4\sheepdftPower.jpgC:\Users\John\ImageProcessing\Homework4\sheepPhase.jpg

The Power(Right) And Phase(Left) of the sword

C:\Users\John\ImageProcessing\Homework4\sheepidftImagenone.jpgC:\Users\John\ImageProcessing\Homework4\sword.png

The IDFT(Right) and the Original Image(Left)

C:\Users\John\ImageProcessing\Homework4\sheepidftImagephase.jpgC:\Users\John\ImageProcessing\Homework4\sheepidftImagepower.jpg

The IDFT with just the Phase(Left) and Power(Right)

C:\Users\John\ImageProcessing\Homework4\SwitchedPhase1idftImagenone.jpgC:\Users\John\ImageProcessing\Homework4\SwitchedPhase2idftImagenone.jpg

The Skull Power with Sword Phase(Right) and the reverse(Left)