Image Processing Lab
Sem 1
Lab 7: Image Enhancement,Degradation and Restoration
20/09/2018

1.Try to complete the lab questions during the lab time (in lab submission)
2.Please do not copy programs.
3.Please find the cameraman,Book images in the Resources folder

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1. **Image Enhancement**
   (a) Implement global unsharp masking algorithm
   (Refer Maria Petrou Page No. 357)
   (b) Implement single scale retinex algorithm
   (Refer Maria Petrou Page No. 360)

2. **Image Degradation**
   Perform image degradation using motion blur
   (use Book.tif)
   Steps:
   (a) Compute Fourier transform of image
   (b) Multiply the transform by $H(u, v)$ given by:

$$H(u,v) = \frac{T}{\pi(ua+vb)} sin(\pi(ua+vb)) e^{-j\pi(ua+vb)} \tag{1}$$

   where $a = b = 0.1$ and $T = 1$
   (c) Take the inverse transform of resultant image to get the motion blurred image
   (Refer Gonzalez Page 350, Example 5.10)

3. **Image Degradation**
   Perform image degradation using atmospheric turbulence
   (use Book.tif)
   Steps:
   (a) Compute Fourier transform of image
   (b) Multiply the transform by $H(u, v)$ given by:

$$H(u,v) = e^{-k(u^2+v^2)^{5/6}} \tag{2}$$

   where $k = 0.0025$(severe turbulence),$k = 0.001$(mild turbulence) and $k = 0.00025$(low turbulence)
   (c) Take the inverse transform of resultant image to get the degraded image

4. **Image Restoration**
   Perform image restoration on the motion blurred image obtained from Qn.2, using inverse filtering.
   Steps:

$$Fourier - Transform - of - restored - image = \frac{G(u,v)}{H(u,v)} \tag{3}$$

   where $H(u,v)$ is degradation function from Qn.2 and $G(u,v)$ is the fourier transform of degraded(input) image
   (Refer Gonzalez Page 351)