Digital Image Processing: Assignment 2

This will the last assignment for this course. It is due on November 16' 2015.

Image Morphology

Apply the techniques discussed from the lectures of Image Morphology in separating out the words from the text given in **input_text.png**. You may consider bin-arizing the image as a preprocessing step

Unitary Transforms

1. Load the image **sunflower.jpg** and display its Discrete Fourier Transform (DFT) spectra. Filter the DFT coefficients with filters having the following Region of Supports: $(-0.2 \times \pi, 0.2 \times \pi)$. Observe the effect and report your observation.

2. Divide the image **sunflower.jpg** to 8×8 blocks. Compute the DCT for each block. Retain the top 25% of highest DCT coefficients (highest with respect to magnitude) in each block and set the other coefficients to zero. Take the inverse DCT for each of the blocks and subsequently display the reconstructed image. Compute the reconstruction error.

3. Perform a one level wavelet decomposition on the 512×512 image **lena.jpg**.

4. Read the images **calender.jpg** and **hand.jpg** and take their Fourier Transforms. Swap the phase spectra of the Fourier Transforms of the images with each other while keeping their magnitude spectra unchanged and take the inverse Fourier Transforms. Display the resulting images and record your observations.

Image Restoration

The aerial image **degraded.tif** has been degraded with atmospheric turbulence. The goal is to restore this image using the Pseudo inverse filter . Display the restored images in each case.

Hough Transform

Implement a version of the Hough transform, to detect the lines on the image **building.jpg**. Vary the number of bins used in the accumulator matrix and observe the result.