**Digital Image Processing Laboratory**

1. Take grayscale image of size 512x512 and perform the following operations -
2. Decrease its **spatial resolution by half** every time and observe its change when displaying in the same window size.
3. Decrease it **intensity level resolution** by one bit up to reach its binary format observe its change when displaying in the same window size.
4. Illustrate the **histogram** of the image and make single threshold segmentation observed from the histogram.
5. Take grayscale image of size 512x512 and perform the following operations –
6. Perform the **brightness enhancement** of a specific range of gray levels and observe its result.
7. Differentiate the results of **power law** transform and **inverse logarithmic** transform.
8. Find the difference image between original and the image obtained by last three bits (MSB)
9. Take grayscale image of size 512x512, add some salt & pepper noise and perform the following operations –
10. Apply **average** and **median** spatial filters with 5x5 mask and observe their performance for noise suppression in term of PSNR
11. Use different size of mask (3x3, 5x5, 7x7) with average filter for noise suppression and observe their performance in term of PSNR
12. Apply harmonic and geometric mean filter on the noisy image and compare their performance with PSNR
13. Take grayscale image of size 512x512, add some Gaussian noise and perform the following operations in frequency domain –
14. Apply 4th order Butterworth and Gaussian low pass filter to analyze their performance quantitatively
15. Observe the ringing effect of ideal low pass filter on the image. Use different radius (D0) of ideal low pass filter and display their results
16. Perform edge detection of given the noise and clean image using ideal and Gaussian high pass filters.
17. Take a binary image and a structuring element to perform the following morphological operations –
18. Erosion and Dilation operations
19. Opening and Closing operations
20. Boundary extraction using morphological operation