Digital Image Processing (EE-608)
Lab Assignment 2

AIM

Link for sample images : 🖻 Sample Images

1. **Take two images, binarize them and apply arithmetic operations on them.Take care of out of bound values and zero division errors.**

   a) Addition: Corresponding pixel values are added and results in increasing intensity. Used for noise suppression.
   b) Subtraction: Corresponding pixel values are subtracted and results in overall intensity decrease. Used for change detection.
   c) Multiplication: Corresponding pixel values are multiplied and generally used in mask operations. Used for noise suppression and adding details.
   d) Division: Corresponding pixel values are divided and generally used for shadow removal and non-homogenous illumination.

2. **Take two same size images, Binarize the image using some threshold, Now apply logical operations on them.**

   a) Binarization: Reducing all the pixels to either black or white (no Gray in between)
   b) OR: Logical operation that returns high value (255 in our case) when either of the values provided to it are high. Returns low only when both inputs are low.
   c) AND: Logical operation that returns high value only when both inputs are high else it returns low value.
   d) NOT: Logical operation that complements the original value.
   e) XOR: Logical operation that returns high only when one of the values is high and other is low, else it returns low.
   f) XNOR: Logical operation that returns high when both its input is

high, else returns low. It is the complement of XOR.

3. **For the given images, apply nearest neighbour interpolation, bilinear interpolation and bicubic interpolation. Analyse results.**

a) Nearest Neighbor interpolation: Assigns the value of the closest pixel to the new pixel, making it fastest but producing blocky or jagged images.
b) Bilinear interpolation: Computes the new pixel value using a weighted average of the four nearest pixels, resulting in smoother images than nearest neighbor.
c) Bicubic interpolation: Uses a weighted average of the 16 nearest pixels to produce smoother and more visually pleasing results, especially for image scaling.