

Practical Work N°2: Image_Quality_Enhancement

1. Read and display the image "color-img.png" located at "path\\color-img.png". For this purpose, use the OpenCV library.
2. This image is in color. Convert it to grayscale with intensity values in the range [0, 255].
3. Display this image and save it as "gray.png" in the path "path\\gray.png".
4. Create an image with dimensions 200×200 such that the values of all pixels are equal to zero. Display the image and create its histogram.
5. apply a simple transformation to the gray image, using the following formula:

$$g(x, y) = \sqrt{f(x, y)}$$

Display the two images before and after the transformation.

6. Convert the gray image $f(x, y)$ into a binary image using a threshold $s = 127$.
7. Consider the following image:

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 0 \\ 1 & 3 & 3 & 2 & 1 \\ 1 & 3 & 2 & 3 & 1 \\ 1 & 2 & 3 & 3 & 1 \\ 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

Display its histogram (the result should be similar to the following figure).

8. Give the histogram of the gray image from Question 3 and perform its equalization by displaying the equalized histogram. Display the image after equalization.
9. Write two functions: the first function generates a Gaussian kernel, and the second function performs 2D convolution between an image and a kernel.