

Image Processing using Scilab – Exercise

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Write Scilab programs to achieve the following tasks:

1. Read a color image, separate R, G, B channels and plot the histograms of each channel.
(Hint: use imread, imhist, and plot functions)
2. Gamma correction – Read a grayscale image, normalize the intensity to the range (0,1), apply the gamma function $I' = I^{\gamma}$, rescale the image to the range (0,255), and display the resulting image. Vary the values of ' γ ' and observe the image contrast.
(Hint: use imread, imshow functions)
3. Read two grayscale images of equal sizes, detect their edges, find the absolute difference between the edges of two images, and display the difference image.
(Hint: use imread, edge, imabsdiff, imshow functions)
4. Read a grayscale image, add motion blur to the image and display the motion blurred image.
(Hint: use imread, imshow functions, write your own code to perform moving average)
5. Read a grayscale image, add Gaussian noise to the image, perform Gaussian smoothing to remove it, and display the image.
(Hint: use imread, imnoise, fspecial, imfilter, imshow functions)
6. Read a grayscale image, add salt & pepper noise to it, and now try to remove the noise using a median filter.
(Hint: use imread, imnoise, imshow functions, write your own median filter)

7. Read a grayscale image, construct Laplacian pyramid and Gaussian pyramid on the image, and display the image on each level.
(Hint: use `imread`, `impyramid`, `fspecial`, `imfilter`, `imshow` functions)
8. Read a grayscale image, perform histogram equalization on the image, and display the resulting image.
(Hint: use `imread`, `imhist`, `imshow` functions, might need to write your code for histogram equalization)
9. Read a grayscale image; detect the corners in the image.
(Hint: use Harris corner detector)
10. Read a grayscale image, introduce Gaussian noise and Gaussian blur, design a Wiener filter to restore the image.
(Hint: use `imread`, `imnoise`, `fspecial`, `imfilter`, `imshow` functions, write code for Wiener filter)