Pengolahan Citra

**5. Filtering LPH dan HPF in domain frequency**

**Dosen Pengampu**

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**TAHUN AKADEMIK 2021/2022**

**Source Code :**

def spektrum():

    img = cv2.imread('gambar/kuda.jpg', 0)

    img\_float32 = np.float32(img)

    dft = cv2.dft(img\_float32, flags=cv2.DFT\_COMPLEX\_OUTPUT)

    dft\_shift = np.fft.fftshift(dft)

    magnitude\_spectrum = 20 \* \

        np.log(cv2.magnitude(dft\_shift[:, :, 0], dft\_shift[:, :, 1]))

    plt.subplot(121), plt.imshow(img, cmap='gray')

    plt.title('Input Image'), plt.xticks([]), plt.yticks([])

    plt.subplot(122), plt.imshow(magnitude\_spectrum, cmap='gray')

    plt.title('Magnitude Spectrum'), plt.xticks([]), plt.yticks([])

    plt.show()

    return

def spektrum2():

    img = cv2.imread('gambar/kuda.jpg', 0)

    f = np.fft.fft2(img)

    fshift = np.fft.fftshift(f)

    magnitude\_spectrum = 20\*np.log(np.abs(fshift))

    plt.subplot(121), plt.imshow(img, cmap='gray')

    plt.title('Input Image'), plt.xticks([]), plt.yticks([])

    plt.subplot(122), plt.imshow(magnitude\_spectrum, cmap='gray')

    plt.title('Magnitude Spectrum'), plt.xticks([]), plt.yticks([])

    plt.show()

    return

def afterhpfjet():

    img = cv2.imread('gambar/kuda.jpg', 0)

    f = np.fft.fft2(img)

    fshift = np.fft.fftshift(f)

    magnitude\_spectrum = 20\*np.log(np.abs(fshift))

    rows, cols = img.shape

    crow, ccol = int(rows/2), int(cols/2)

    print(crow, ccol)

    fshift[crow-30:crow+30, ccol-30:ccol+30] = 0

    f\_ishift = np.fft.ifftshift(fshift)

    img\_back = np.fft.ifft2(f\_ishift)

    img\_back = np.abs(img\_back)

    plt.subplot(131), plt.imshow(img, cmap='gray')

    plt.title('Input Image'), plt.xticks([]), plt.yticks([])

    plt.subplot(132), plt.imshow(img\_back, cmap='gray')

    plt.title('Image after HPF'), plt.xticks([]), plt.yticks([])

    plt.subplot(133), plt.imshow(img\_back)

    plt.title('Result in JET'), plt.xticks([]), plt.yticks([])

    plt.show()

    return

def spektrum3():

    img = cv2.imread('gambar/kuda.jpg', 0)

    dft = cv2.dft(np.float32(img), flags=cv2.DFT\_COMPLEX\_OUTPUT)

    dft\_shift = np.fft.fftshift(dft)

    rows, cols = img.shape

    crow, ccol = int(rows/2), int(cols/2)

    # create a mask first, center square is 1, remaining all zeros

    mask = np.zeros((rows, cols, 2), np.uint8)

    mask[crow-30:crow+30, ccol-30:ccol+30] = 1

    # apply mask and inverse DF1

    fshift = dft\_shift\*mask

    f\_ishift = np.fft.ifftshift(fshift)

    img\_back = cv2.idft(f\_ishift)

    img\_back = cv2.magnitude(img\_back[:, :, 0], img\_back[:, :, 1])

    plt.subplot(121), plt.imshow(img, cmap='gray')

    plt.title('Input Image'), plt.xticks([]), plt.yticks([])

    plt.subplot(122), plt.imshow(img\_back, cmap='gray')

    plt.title('Magnitude Spectrum'), plt.xticks([]), plt.yticks([])

    plt.show()

    return

def lapsobel():

    img = cv2.imread("gambar/kuda.jpg", 0)

    laplacian = cv2. Laplacian(img, cv2.CV\_64F)

    sobelx = cv2.Sobel(img, cv2.CV\_64F, 1, 0, ksize=5)

    sobely = cv2.Sobel(img, cv2.CV\_64F, 0, 1, ksize=5)

    plt.subplot(2, 2, 1), plt.imshow(img, cmap='gray')

    plt.title('Original'), plt.xticks([]), plt.yticks([])

    plt.subplot(2, 2, 2), plt.imshow(laplacian, cmap='gray')

    plt.title('Laplacian'), plt.xticks([]), plt.yticks([])

    plt.subplot(2, 2, 3), plt.imshow(sobelx, cmap='gray')

    plt.title('Sobel X'), plt.xticks([]), plt.yticks([])

    plt.subplot(2, 2, 4), plt.imshow(sobely, cmap='gray')

    plt.title('Sobel Y'), plt.xticks([]), plt.yticks([])

    plt.show()

    return

def hpffilter():

    # simple averaging filter without scaling parameter

    mean\_filter = np.ones((3, 3))

    # creating a guassian filter

    x = cv2.getGaussianKernel(5, 10)

    gaussian = x\*x.T

    # different edge detecting

    # scharr in x-direction

    scharr = np.array([[-3, 0, 3],

                       [-10, 0, 10],

                       [-3, 0, 3]])

    # sobel in x direction

    sobel\_x = np.array([[-1, 0, 1],

                       [-2, 0, 2],

                       [-1, 0, 1]])

    # sobel in y direction

    sobel\_y = np.array([[-1, -2, -1],

                       [0, 0, 0],

                       [1, 2, 1]])

    # :Laplacian

    laplacian = np.array([[0, 1, 0],

                         [1, -4, 1],

                          [0, 1, 0]])

    filters = [mean\_filter, gaussian, laplacian, sobel\_x, sobel\_y, scharr]

    filter\_name = ['mean filter', 'gaussian', 'laplacian', 'sobel\_x',

                   'sobel\_y', 'scharr\_x']

    fft\_filters = [np.fft.fft2(x) for x in filters]

    fft\_shift = [np.fft.fftshift(y) for y in fft\_filters]

    mag\_spectrum = [np.log(np.abs(z)+1) for z in fft\_shift]

    for i in range(6):

        plt.subplot(2, 3, i+1), plt.imshow(mag\_spectrum[i], cmap='gray')

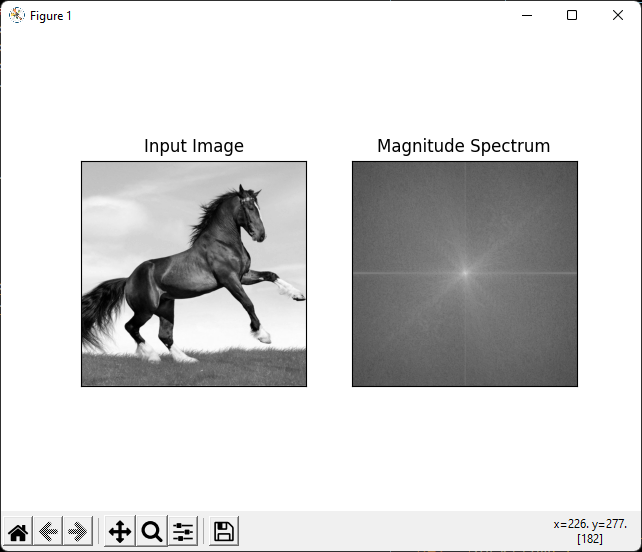
        plt.title(filter\_name[i]), plt.xticks([]), plt.yticks([])

    plt.show()

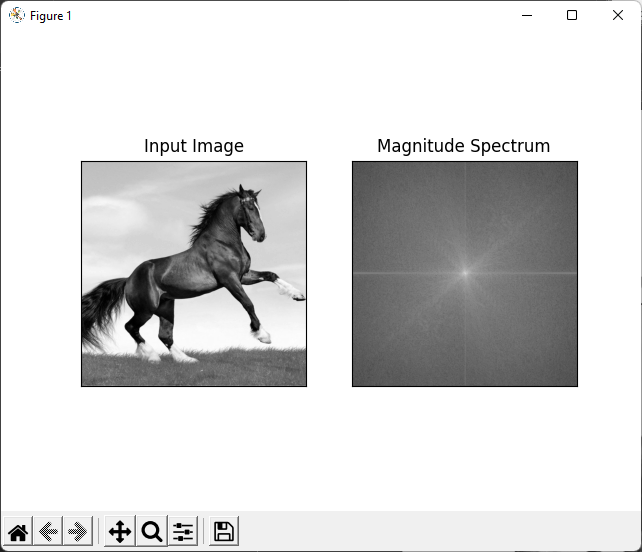
    return

**Output :**

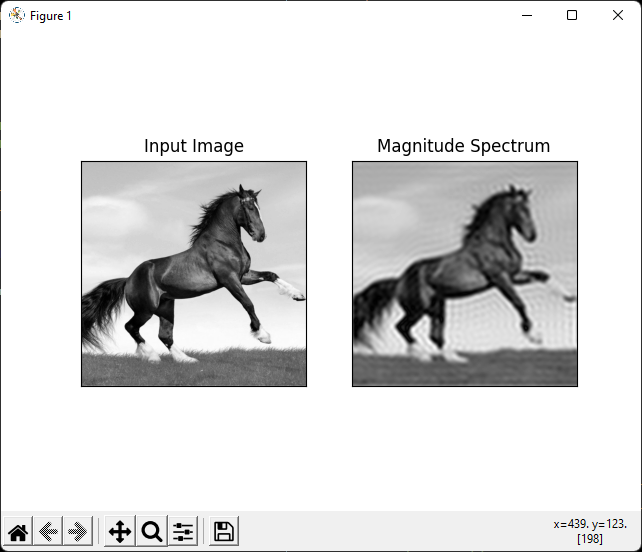
spektrum()

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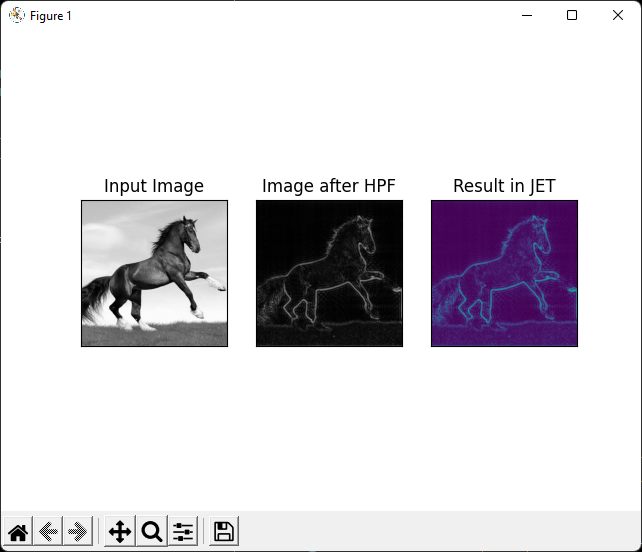
spektrum2()

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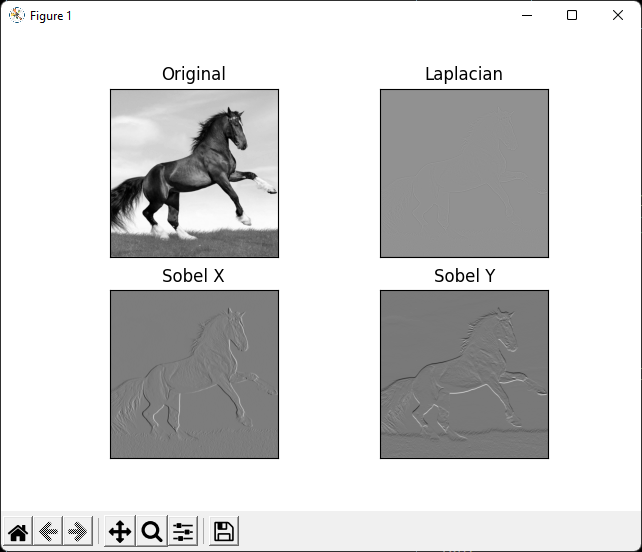
spektrum3()

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afterhpfjet()

****

lapsobel()



hpffilter()

