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In [ ]: #!/usr/bin/env python
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__license__ = "Feel free to copy, I appreciate if you acknowledge Python for Microscopist

import cv2
import numpy as np
from scipy.signal import convolve2d
from scipy.ndimage import convolve
from skimage import io, img_as_float
import matplotlib.pyplot as plt

# Load images
img_gaussian_noise = img_as_float(io.imread('image1.jpeg', as_gray=True))
img_salt_pepper_noise = img_as_float(io.imread('image2.jpeg', as_gray=True))

# Choose an image to work with
img = img_salt_pepper_noise

# Define kernels
kernel = np.ones((5,5), np.float32) / 25
gaussian_kernel = np.array([[1/16, 1/8, 1/16], [1/8, 1/4, 1/8], [1/16, 1/8, 1/16]])
laplacian = np.array([[0., 1, 0], [1, -4, 1], [0, 1, 0]])
gabor = cv2.getGaborKernel((5, 5), 1.4, 45, 5, 1)

# Apply filters using different methods
conv_using_cv2 = cv2.filter2D(img, -1, kernel, borderType=cv2.BORDER_CONSTANT)
conv_using_scipy = convolve2d(img, kernel, mode='same')
conv_using_scipy2 = convolve(img, kernel, mode='constant', cval=0.0)

# Display images inline
fig, axes = plt.subplots(1, 4, figsize=(15, 5))
axes[0].imshow(img, cmap='gray')
axes[0].set_title("Original")
axes[0].axis('off')

axes[1].imshow(conv_using_cv2, cmap='gray')
axes[1].set_title("cv2 filter")
axes[1].axis('off')

axes[2].imshow(conv_using_scipy, cmap='gray')
axes[2].set_title("Using scipy")
axes[2].axis('off')

axes[3].imshow(conv_using_scipy2, cmap='gray')
axes[3].set_title("Using scipy2")
axes[3].axis('off')

plt.show()
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