import cv2

import numpy as np

import matplotlib.pyplot as plt

# Load the image

image = cv2.imread('image.jpg', cv2.IMREAD\_GRAYSCALE)

# Apply Sobel filter

sobel\_x = cv2.Sobel(image, cv2.CV\_64F, 1, 0, ksize=5) # Sobel in x direction

sobel\_y = cv2.Sobel(image, cv2.CV\_64F, 0, 1, ksize=5) # Sobel in y direction

sobel\_combined = cv2.magnitude(sobel\_x, sobel\_y)

# Define Prewitt kernels

prewitt\_x = np.array([[1, 0, -1], [1, 0, -1], [1, 0, -1]], dtype=np.float32)

prewitt\_y = np.array([[1, 1, 1], [0, 0, 0], [-1, -1, -1]], dtype=np.float32)

# Apply Prewitt filter

prewitt\_x\_result = cv2.filter2D(image, cv2.CV\_64F, prewitt\_x)

prewitt\_y\_result = cv2.filter2D(image, cv2.CV\_64F, prewitt\_y)

prewitt\_combined = cv2.magnitude(prewitt\_x\_result, prewitt\_y\_result)

# Display results

plt.figure(figsize=(12, 6))

plt.subplot(1, 3, 1)

plt.imshow(image, cmap='gray')

plt.title('Original Image')

plt.axis('off')

plt.subplot(1, 3, 2)

plt.imshow(sobel\_combined, cmap='gray')

plt.title('Sobel Edge Detection')

plt.axis('off')

plt.subplot(1, 3, 3)

plt.imshow(prewitt\_combined, cmap='gray')

plt.title('Prewitt Edge Detection')

plt.axis('off')

plt.tight\_layout()

plt.show()