19.

import cv2

import numpy as np

import matplotlib.pyplot as plt

from google.colab import files

uploaded = files.upload()

image\_path = next(iter(uploaded))

img = cv2.imread(image\_path, cv2.IMREAD\_GRAYSCALE)

sobel\_x = cv2.Sobel(img, cv2.CV\_64F, dx=1, dy=0, ksize=3)

sobel\_y = cv2.Sobel(img, cv2.CV\_64F, dx=0, dy=1, ksize=3)

sobel\_magnitude = np.sqrt(sobel\_x\*\*2 + sobel\_y\*\*2)

sobel\_magnitude = np.uint8(np.clip(sobel\_magnitude, 0, 255))

plt.figure(figsize=(15, 5))

plt.subplot(1, 3, 1)

plt.title("Original Grayscale Image")

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

plt.subplot(1, 3, 2)

plt.title("Sobel X")

plt.imshow(np.uint8(np.clip(np.absolute(sobel\_x), 0, 255)), cmap='gray')

plt.subplot(1, 3, 3)

plt.title("Sobel Edge Magnitude (XY)")

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

plt.tight\_layout()

plt.show()

OUTPUT:

