16 question

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import cv2
import numpy as np

# Step 1: Read the input image
image = cv2.imread(r"C:\Users\SAIL\Downloads\CV\keypad.jpg")     # Replace with your image path
if image is None:
        raise ValueError("Image not found. Please check the file path.")

# Step 2: Convert the image to grayscale
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

# Step 3: Apply Sobel filter in X direction
sobel_x = cv2.Sobel(gray, cv2.CV_64F, dx=1, dy=0, ksize=3)

# Step 4: Apply Sobel filter in Y direction
sobel_y = cv2.Sobel(gray, cv2.CV_64F, dx=0, dy=1, ksize=3)

# Step 5: Compute the magnitude of the gradient
sobel_combined = cv2.magnitude(sobel_x, sobel_y)
sobel_combined = cv2.convertScaleAbs(sobel_combined)

# Optional: Convert individual x and y gradients to displayable format
sobel_x_display = cv2.convertScaleAbs(sobel_x)
sobel_y_display = cv2.convertScaleAbs(sobel_y)
```

Step 6: Display the results

cv2.imshow('Original Image', image)

cv2.imshow('Sobel X', sobel_x_display)

cv2.imshow('Sobel Y', sobel_y_display)

cv2.imshow('Sobel Combined', sobel_combined)

cv2.waitKey(0)

cv2.destroyAllWindows()