**Step 1: Upload the Image**

from google.colab import files

uploaded = files.upload()

Step 2: Load and Process the Image from google.colab import files

import cv2

import numpy as np

import matplotlib.pyplot as plt

# Upload image

uploaded = files.upload()

# Load the image (ensure you use the correct filename)

image\_path = list(uploaded.keys())[0] # Get the name of the uploaded file

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

# Check if the image was loaded successfully

if image is None:

raise ValueError(f"Image at path {image\_path} could not be loaded. Please check the path.")

# Apply Sobel filter in the x-direction (horizontal edges)

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

# Apply Sobel filter in the y-direction (vertical edges)

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

# Convert the results to uint8 for display

sobel\_x\_abs = cv2.convertScaleAbs(sobel\_x)

sobel\_y\_abs = cv2.convertScaleAbs(sobel\_y)

# Display the original image and the edge-detected images using matplotlib

plt.figure(figsize=(10, 10))

# Display the original image

plt.subplot(1, 3, 1)

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

plt.title('Original Image')

plt.axis('off')

# Display the edge detection results in x-direction (Sobel-X)

plt.subplot(1, 3, 2)

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

plt.title('Edge Detection (Sobel-X)')

plt.axis('off')

# Display the edge detection results in y-direction (Sobel-Y)

plt.subplot(1, 3, 3)

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

plt.title('Edge Detection (Sobel-Y)')

plt.axis('off')

plt.tight\_layout()

plt.show()