# Step 1: Install OpenCV (if not installed)

!pip install opencv-python-headless

# Step 2: Import libraries

import cv2

import numpy as np

from matplotlib import pyplot as plt

from google.colab import files

# Step 3: Upload the image

print("Upload an image:")

uploaded = files.upload()

image\_path = next(iter(uploaded))

# Step 4: Read and convert to grayscale

img = cv2.imread(image\_path)

gray = cv2.cvtColor(img, cv2.COLOR\_BGR2GRAY)

# Step 5: Define Prewitt kernels for x and y directions

kernelx = np.array([[1, 0, -1],

[1, 0, -1],

[1, 0, -1]])

kernely = np.array([[1, 1, 1],

[0, 0, 0],

[-1, -1, -1]])

# Step 6: Apply convolution using filter2D

edge\_x = cv2.filter2D(gray, -1, kernelx)

edge\_y = cv2.filter2D(gray, -1, kernely)

# Combine the two directions

edges = cv2.addWeighted(edge\_x, 0.5, edge\_y, 0.5, 0)

# Step 7: Display the result

plt.figure(figsize=(12, 5))

plt.subplot(1, 2, 1)

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

plt.title("Original Grayscale")

plt.subplot(1, 2, 2)

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

plt.title("Edge Detected (Prewitt)")

plt.show()

# Step 8: Save the result

cv2.imwrite("edge\_detected.jpg", edges)

print("Saved as edge\_detected.jpg")

