HOMEWORK 6

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Lớp: D20CQCNPM02-N

MSSV: N20DCCN134

1. Code
2. import numpy as np  
   import matplotlib.pyplot as plt  
     
   def read\_data(data\_path, size):  
    with open(data\_path, 'rb') as file:  
    data = np.fromfile(file, dtype=np.uint8, count=size \* size)  
    return np.reshape(data, (size, size))  
     
   def show\_image( x,x1, x2, x3, name):  
    plt.figure(figsize=(12, 6))  
    plt.subplot(2, 2, 1)  
    plt.imshow(x2, cmap='gray', vmin=0, vmax=255)  
    plt.axis('image')  
    plt.axis('off')  
    plt.title(f"({name})", fontsize=12)  
     
    plt.subplot(2, 2, 2)  
    plt.imshow(x, cmap='gray', vmin=0, vmax=255)  
    plt.axis('image')  
    plt.axis('off')  
    plt.title(f"3x3 Median Filter ({name})", fontsize=12)  
     
    plt.subplot(2, 2, 3)  
    plt.imshow(x1, cmap='gray', vmin=0, vmax=255)  
    plt.axis('image')  
    plt.axis('off')  
    plt.title(f"3x3 Morphological Opening ({name})", fontsize=12)  
     
    plt.subplot(2, 2, 4)  
    plt.imshow(x3, cmap='gray', vmin=0, vmax=255)  
    plt.axis('image')  
    plt.axis('off')  
    plt.title(f"3x3 Morphological Closing ({name})", fontsize=12)  
    plt.show()  
     
   def filtersAndDisplay(input\_file, size, wd\_size, name):  
    wd\_size1 = wd\_size // 2  
    W = np.zeros((wd\_size, wd\_size))  
    Y = np.zeros((size, size))  
    Y1 = np.zeros((size, size))  
    Y2 = np.zeros((size, size))  
    y3 = np.zeros((size, size))  
    Y4 = np.zeros((size, size))  
    read = read\_data(input\_file, size)  
    for row in range(wd\_size1, size - wd\_size1):  
    for col in range(wd\_size1, size - wd\_size1):  
    W = read[row - wd\_size1:row + wd\_size1 + 1, col - wd\_size1:col + wd\_size1 + 1]  
    Y[row, col] = np.median(W)  
    Y1[row, col] = np.min(W)  
    Y4[row, col] = np.max(W)  
    for row in range(wd\_size1 + 1, size - wd\_size1 - 1):  
    for col in range(wd\_size1 + 1, size - wd\_size1 - 1):  
    W = Y1[row - wd\_size1:row + wd\_size1 + 1, col - wd\_size1:col + wd\_size1 + 1]  
    Y2[row, col] = np.max(W)  
    W = Y4[row - wd\_size1:row + wd\_size1 + 1, col - wd\_size1:col + wd\_size1 + 1]  
    y3[row, col] = np.min(W)  
    show\_image(read, Y, Y2, y3, name)  
   filtersAndDisplay("dataset/camera99.sec", 256, 3, 'camera99')  
   filtersAndDisplay("dataset/camera9.sec", 256, 3, 'camera9')
3. Kết quả:



