

Closing

April 28, 2019

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In [ ]: import numpy as np
import cv2
def pad(img,shp):
    p=np.zeros((shp[0]+1,shp[1]+1))
    p[1:,1:]=np.copy(img)
    p[0,1:]=img[0]
    p[1:,0]=img[:,0]
    p[0,0]=img[0,0]
    p[-1,0]=img[-1,0]
    return p

def comp_erosion(sample,metric):
    for i in range(2):
        for j in range(2):
            if sample[i,j]!=metric[i,j]:
                return False
    return True

def comp_dilation(sample,metric):
    for i in range(2):
        for j in range(2):
            if sample[i,j]==metric[i,j]:
                return True
    return False

def slice(img):
    temp=np.array(img)
    print(temp.shape)
    int_slice=np.zeros((temp.shape[0],temp.shape[1],8))
    for x in range(8):
        int_slice[:, :,x]=temp%(2)
        temp=(temp/2).astype(int)
    return int_slice

def stitch(int_slice,shp):
    out=np.zeros(shp)
    for x in range(8):
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        out=out+int_slice[:, :, x]*(2**x)
    return out

img=cv2.imread('cat.jpeg',0)
shp=img.shape
temp=pad(img,shp)
int_slice=slice(temp)
struct_el=np.array([[1,1],[1,1]])
int_slice_new=np.zeros((shp[0],shp[1],8))
for x in range(8):
    for i in range(shp[0]):
        for j in range(shp[1]):
            if comp_dilation(int_slice[i:i+2,j:j+2,x],struct_el):
                int_slice_new[i,j,x]=1

int_slice=np.array(int_slice_new)
int_slice_new=np.zeros((shp[0],shp[1],8))
for x in range(8):
    test=pad(int_slice[:, :, x],shp)
    for i in range(shp[0]):
        for j in range(shp[1]):
            if comp_erosion(test[i:i+2,j:j+2],struct_el):
                int_slice_new[i,j,x]=1

out=stitch(int_slice_new,shp)
out=np.array(out, dtype = np.uint8)
print(img)
print(out)
cv2.imshow('image', img)
cv2.imshow('closed', out)
cv2.waitKey(0)
cv2.destroyAllWindows()

(351, 529)
[[14 21 29 ...  7  7  7]
 [13 20 28 ...  6  6  6]
 [12 19 28 ...  6  6  6]
 ...
 [ 8  7  5 ...  0  0  0]
 [ 9  8  6 ...  0  0  0]
 [10  9  7 ...  0  0  0]]
[[14 14 29 ...  7  7  7]
 [14 14 29 ...  7  7  7]
 [13 13 29 ...  6  6  6]
 ...
 [ 7  7  6 ...  0  0  0]
 [ 9  9  7 ...  0  0  0]]

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[ 9  9 11 ...  0  0  0]
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In [ ]:
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