Computer Vision hw5

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1.result:

dilation

erosion

closing

opening

2. Main Code

1. dilation :

```
def dilation (img):
    img_size = len(img)
    size =2
    exp=expand(img,2)

    for i in range(size,img_size+size):
        for j in range (size,img_size+size):
            if(exp[i][j]!=0 or True):
                iter = 0
                temp_max  = 0
                for ii in range (i-2,i+3):
                    for jj in range (j-2,j+3):
                        if(iter!=0 and iter !=4 and iter!=20 and iter!=24 ):
                            temp_max = max(temp_max,exp[ii][jj])
                        iter+=1
                img[i-2][j-2][0]=temp_max
                img[i-2][j-2][1]=temp_max
                img[i-2][j-2][2]=temp_max
```

2. erosion :

```
def erosion (img):
    img_size = len(img)
    size =2
    exp=expand(img,2)

    for i in range(size,img_size+size):
        for j in range (size,img_size+size):
            if(exp[i][j]!=0 or True):
                iter = 0
                temp_min  = 255
                for ii in range (i-2,i+3):
                    for jj in range (j-2,j+3):
                        if(iter!=0 and iter !=4 and iter!=20 and iter!=24 ):
                            temp_min = min(temp_min,exp[ii][jj])
                        iter+=1
                img[i-2][j-2][0]=temp_min
                img[i-2][j-2][1]=temp_min
                img[i-2][j-2][2]=temp_min
```

3. opening and closing:

opening : do erosion then dilation

closing : do dilation then erosion

4. main:

```
def main ():
    img = cv2.imread("lena.bmp")
    dilation(img)
    cv2.imwrite("dilation_gary_scale.jpg",img)
    erosion(img)
    cv2.imwrite("closing_gary_scale.jpg",img)
    img = cv2.imread("lena.bmp")
    erosion(img)
    cv2.imwrite("erosion_gary_scale.jpg",img)
    dilation(img)
    cv2.imwrite("opening_gary_scale.jpg",img)
```