IMAGE PROCESSING LAB-3

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Master's In International Biometrics - UPEC

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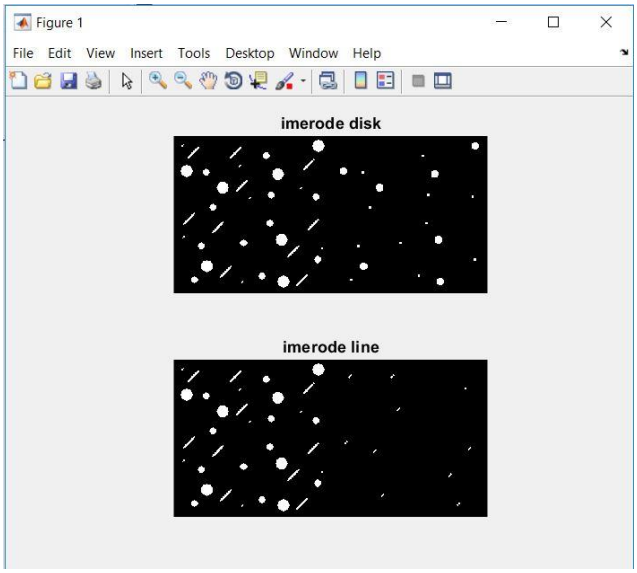
1.Exercise

1.1 Exercise

function strel represent a flat structuring element, v4 and v8 represent a binary valued neighborhood which we process the pixel who is in the center which we call it the origin.

1.2 Exercise

```
I=imread('shapes.png');
level=graythresh(I);
bw=imbinarize(I,level);%transforming the image to a binary image

se=strel('disk',1,4);
j=imerode(bw,se);
subplot(2,1,1),imshowpair(bw,j,'montage'),title('imerode disk');
se2=strel('line',10,45);
j2=imerode(bw,se2);
subplot(2,1,2), imshowpair(bw,j2,'montage'),title('imerode line');

[l,num]=bwlabel(j,8);

d=imdilate(bw,se);
subplot(2,1,1), imshowpair(bw,d,'montage'),title('imedilate disk');
d2=imdilate(bw,se2);
subplot(2,1,2), imshowpair(bw,d2,'montage'),title('imdilate line');


%shapes2
I=imread('shapes2.png');
level=graythresh(I);
bw=imbinarize(I,level);

se=strel('disk',4,4);
j=imerode(bw,se);
subplot(2,1,1),imshowpair(bw,j,'montage'),title('imerode disk');

se2=strel('line',20,45);
j2=imerode(bw,se2);
subplot(2,1,2), imshowpair(bw,j2,'montage'),title('imerode line');
```

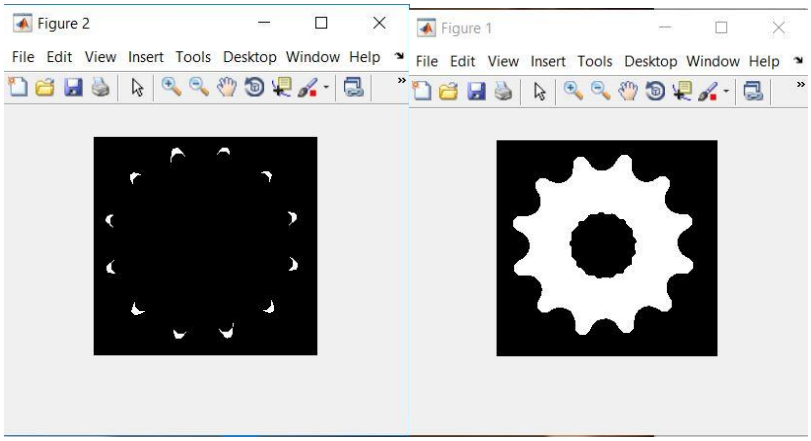


1.3 Exercise

1.3.1 Task

```
I=imread('eng.png');
level=graythresh(I);
bw=imbinarize(I,level);
se=strel('disk',8);
afteropening=imopen(bw,se);
imshow(afteropening),figure,imshow(bw);

bwfilled=imfill(bw,'holes');
afteropening=imopen(bwfilled,se);
result=imsubtract(bwfilled,afteropening);
imshow(result);
[l,num]=bwlabel(result);
```

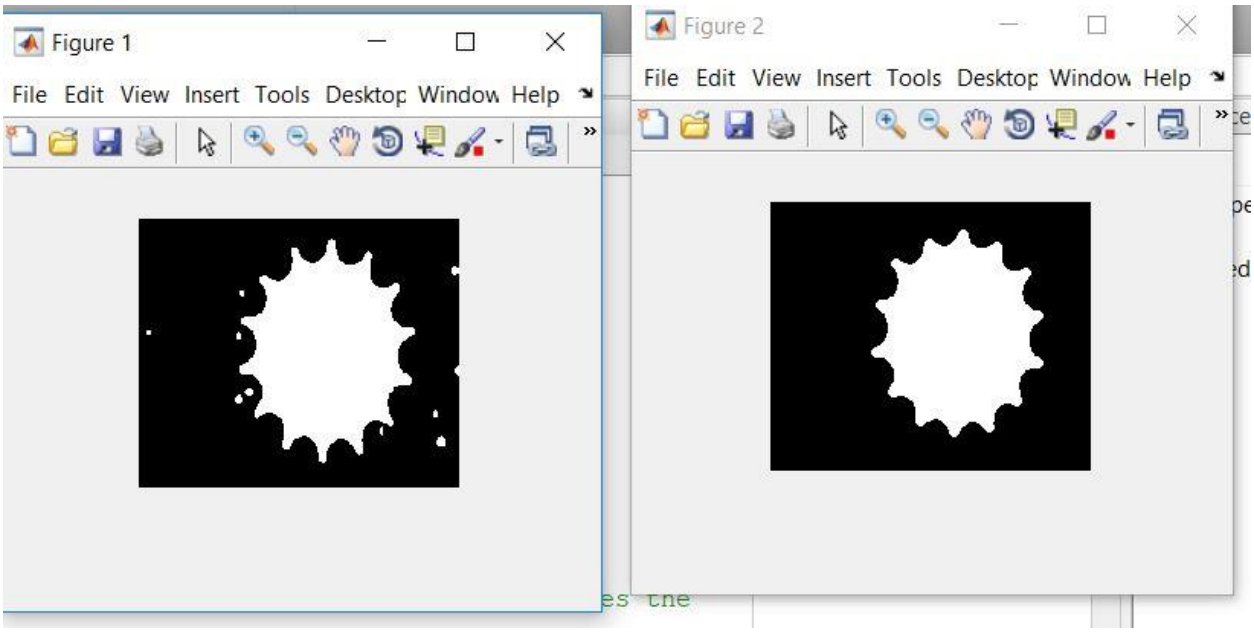
imfill can help fill all unwanted holes in the image that distributes the counting of our object.



1.3.2 Task

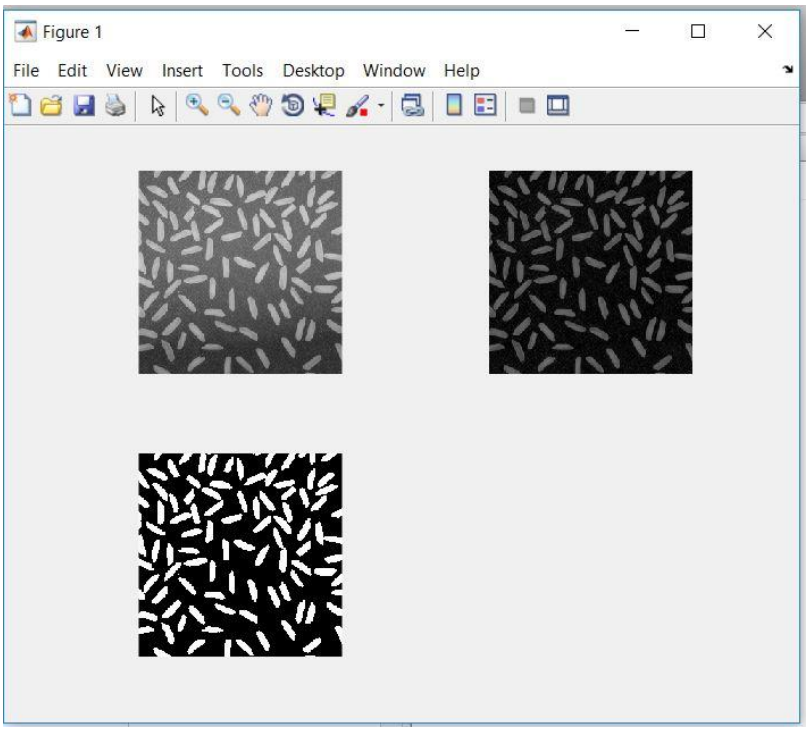
```
%%IMAGE ENG2

I=imread('eng2.png');

level=graythresh(I);

bw=imbinarize(I,level);

bwfilled=imfill(bw,'holes');

imshow(bwfilled);

se=strel('disk',4);

afteropening=imopen(bwfilled,se);

figure, imshow(afteropening);

result = imsubtract(bwfilled,afteropening);

figure,imshow(result);
```

it is not possible to count the number of teeth the same way as before because we have so many exterior holes outside the wheel. so when we subtract we get all of them and if we count , we get the number of all the white object in the image not just the teeth.



1.4 Exercise

```
I=imread('I12.bmp');

subplot(2,2,1),imshow(I);

se=strel('disk',40);

Itophat=imtophat(I,se); %with tophat function we see the difference between

%final image(after opening or closing) and the original image.

subplot(2,2,2),imshow(Itophat);

level=graythresh(Itophat);

threshold=im2bw(Itophat,level);

subplot(2,2,3), imshow(threshold);
```



using imtophat function will make the image darker, after using tophat, automatic thresholding will not change the image intensity. imfill can help fill all unwanted holes in the image that distributes the counting of our object.

2.1 Exercise

```
I=imread('chro.bmp');
I2=imclearborder(I);
subplot(1,2,1),imshow(I), subplot(1,2,2),imshow(I2);
```