AIM

Apply morphology operations on the given test image

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B030
B1
B.Tech CE
8 Sep 2022

In [ ]:
```
import numpy as np
import matplotlib.pyplot as plt
from skimage import io
```

In [ ]:
```
image=io.imread('wood_disk.tif')
image_b=image.copy()
[rows,cols]= image_b.shape
```

In [ ]:
```
for r in range(rows):
    for c in range(cols):
        if image_b[r][c]>100:
            image_b[r][c]=255
        else:
            image_b[r][c]=0
```

In [ ]:
```
image_e=image_b.copy()
""" sz=int(input('Enter your size: ')) """
sz=21
se=255*np.ones([sz,sz])
cent=int((sz-1)/2)
```

In [ ]:
```
for r in range(cent,rows):
    for c in range(cent,cols):
        temp=image_b[r-cent:r+cent+1,c-cent:c+cent+1]
        if np.array_equal(temp,se):
            image_e[r][c]=255
        else:
            image_e[r][c]=0
```

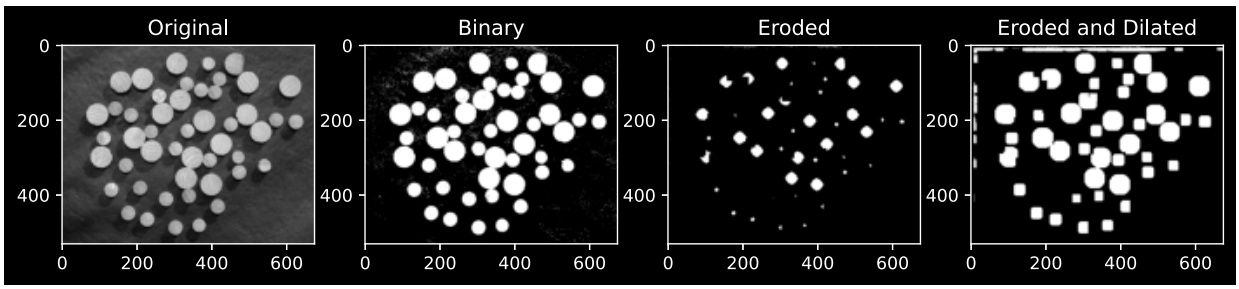
In [ ]:
```
image_d=image_b.copy()
""" sz=int(input('Enter your size: ')) """
sz=21
se=255*np.ones([sz,sz])
cent=int((sz-1)/2)
```

In [ ]:
```
for r in range(cent, rows):
    for c in range(cent, cols):
        temp = image_b[r-cent:r+cent+1, c-cent:c+cent+1]
        if np.isin(255, temp):
            image_d[r][c] = 255
        else:
            image_d[r][c] = 0
```

In [ ]:
```
for r in range(cent, rows):
    for c in range(cent, cols):
        temp = image_e[r-cent:r+cent+1, c-cent:c+cent+1]
        if np.isin(255, temp):
            image_d[r][c] = 255
        else:
            image_d[r][c] = 0
```

In [ ]:
```
plt.figure(figsize=(12, 12))

plt.subplot(1, 4, 1)
plt.imshow(image, cmap='gray')
plt.title("Original")

plt.subplot(1, 4, 2)
plt.imshow(image_b, cmap='gray')
plt.title("Binary")

plt.subplot(1, 4, 3)
plt.imshow(image_e, cmap="gray")
plt.title("Eroded")

plt.subplot(1, 4, 4)
plt.imshow(image_d, cmap="gray")
plt.title("Eroded and Dilated")
```

Out[ ]:
```
Text(0.5, 1.0, 'Eroded and Dilated')
```



Conclusion

- The given image is eroded using the structural element of 5 x 5.
- The eroded image shows that all the noisy pixels of size less than 5 x 5 disappear, and size of the white circles reduces to a smaller value.
- The size of the structuring element is increased to 21 x 21, result is that fewer and smaller circles are observed in the image.

- The given image is dialted using square structuring element of size 5 x 5.

- It is observedd that size of all the objects increase by 2 rows and 2 columns.
- If size of the structuring element is increased to 21 x 21, the size of the objected on the image increases.
- To remove noisy pixels of the given image, the image is eroded by structuring element of size 11 x 11, which removes all the objects of size smaller than 11 x 11
- However to regain the size of smaller objects, eroded image is dilated using structuring element of the same size.
- Final Image is a clean image without any noisy objects.