

AULA PRÁTICA 6. PRACTICAL CLASS 6

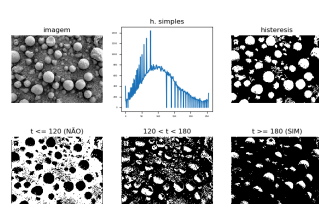
1. SEGMENTAÇÃO POR LIMIAÇÃO DO HISTOGRAMA. SEGMENTATION BY HISTOGRAM THRESHOLD.

```
h, r = np.histogram(F, bins=256, range=(0, 256))
```

- 1.1. Segmentar a imagem **marilyn.tif** pelo valor da sua média. *Segment the image **marilyn.tif** by its mean value.*
- 1.2. Segmentar a imagem **hematite_mars.tif** por limiarização do histograma por histeresis. *Segment the **hematite.mars.tif** image by hysteresis histogram thresholding.*

```

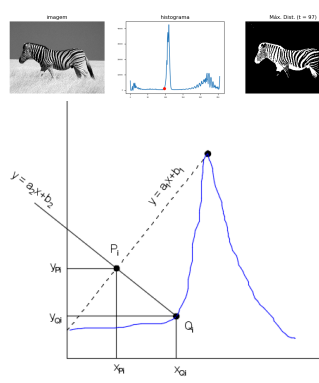
from skimage.morphology import binary_dilation
def reconstrucao_bin(mask, marker):
    se = rectangle(3, 3)
    ant = np.zeros(mask.shape)
    R = deepcopy(marker)
    while np.array_equal(R, ant)!=False:
        ant = R
        R = np.logical_and(binary_dilation(R, se), mask)
    return R
t3_1 = ?
t3_2 = ?
X = F<=t3_1
Y = F>=t3_2
M = np.logical_not(np.logical_or(X, Y))
Z = reconstrucao_bin(M, np.logical_and(binary_dilation(Y, rectangle(3, 3)), M))
TH3 = np.logical_or(Y, Z)
                    
```



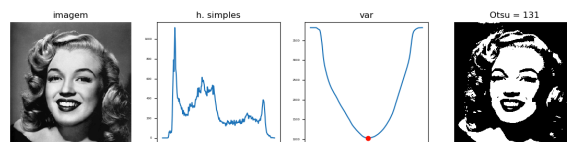
- 1.3. Segmentar a imagem **zebra01.tif** pelo método da distância máxima. *Segment the **zebra01.tif** image by the maximum distance method.*

```

# recta y = ax+b
xmax = np.where(h==np.max(h)); xmax = xmax[0][0]
ymax = h[xmax]
x1 =
y1 =
x2 =
y2 =
a1 = (y2-y1)/(x2-x1)
b1 = y1-a1*x1
a2 =
b2 = np.zeros((256)); x = np.copy(b2); y = np.copy(b2); d = np.copy(b2)
for i in range(xmax):
    b2[i] = h[i]-a2*i # ordenada na origem da recta perpendicular
    x[i] = (b1-b2[i])/(a2-a1)
    y[i] = a2*(b1-b2[i])/(a2-a1)+b2[i]
    d[i] = np.sqrt((x[i]-i)**2+(y[i]-h[i])**2)
t7 = np.where(d==np.max(d)); t7 = t7[0][0]
                    
```



- 1.4. Segmentar a imagem **marilyn.tif** pelo método de limiarização automática de Otsu. *Segment the **marilyn.tif** image by the Otsu automatic thresholding method.*



2. HISTOGRAMA MULTIVARIADO. *MULTIVARIATE HISTOGRAM.*

2.1. Construir o histograma multivariado para a imagem de 24-bits **ik01.tif** e ilustrá-los com *scatters* 3D.
Build the multivariate histogram for the 24-bit ik01.tif image and illustrate them with 3D scatters.

