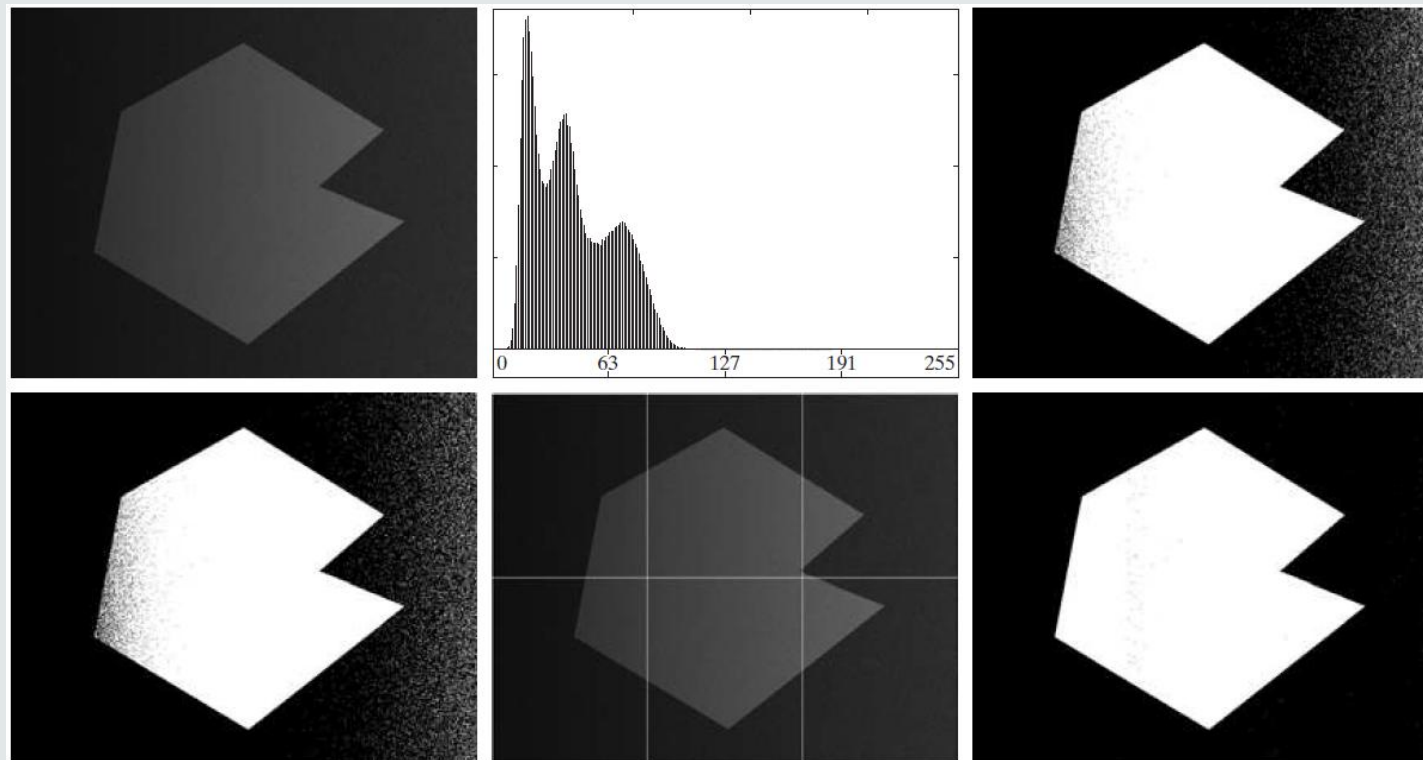




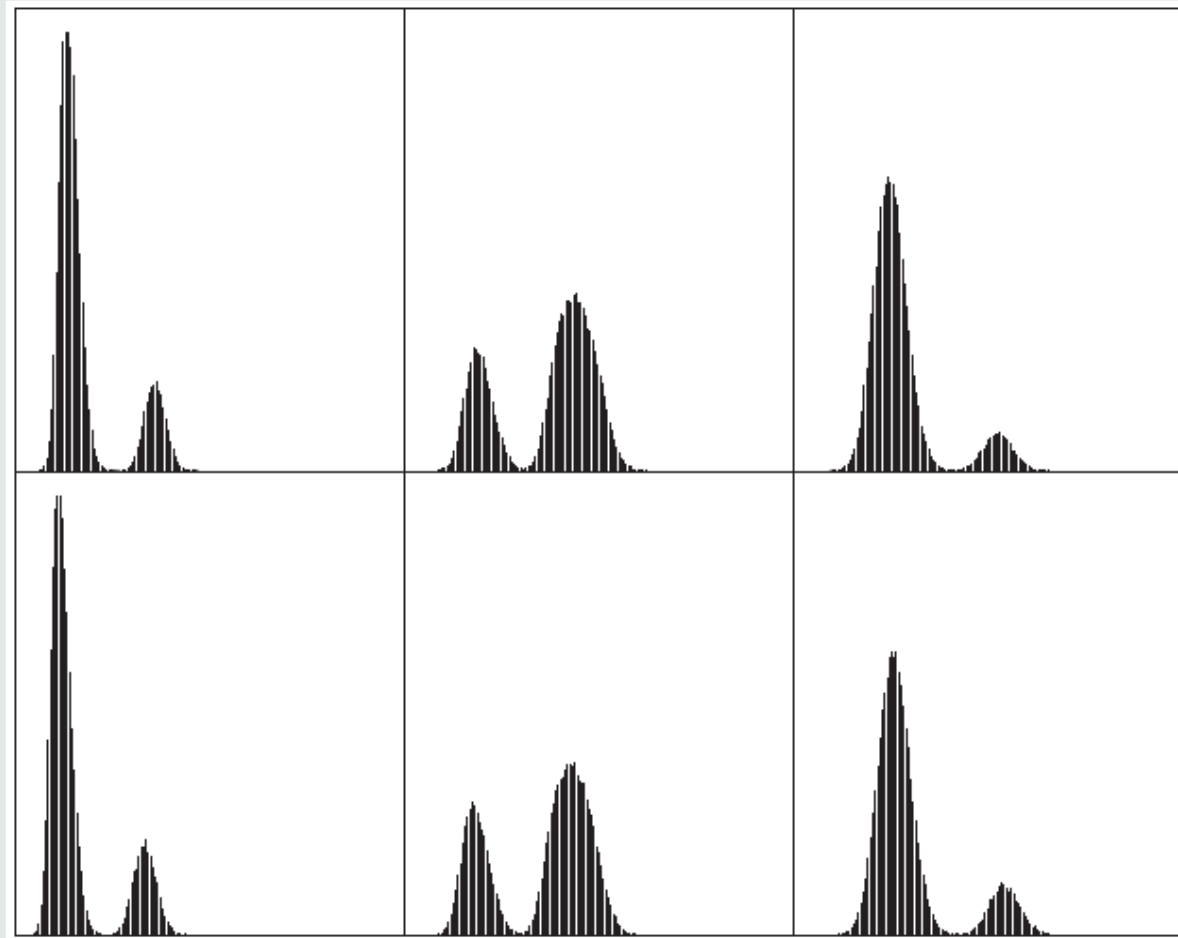
# VARIABLE THRESHOLDING

Segmentation

# IMAGE PARTITIONING



# IMAGE PARTITIONING



# LIMITATIONS OF IMAGE PARTITIONING

- Size of object and background must be comparable

# VARIABLE THRESHOLDING

- Local image properties
- Threshold at every point  $(x,y)$  looking at its neighbours

# VARIABLE THRESHOLDING (BASIC APPROACH)

- Use standard deviation & mean of the pixels in the neighbourhood
- $\sigma_{xy}$  and  $m_{xy}$  are standard deviation and mean value of the pixels in neighbourhood  $S_{xy}$

$$T_{xy} = a\sigma_{xy} + bm_{xy} \text{ or } T_{xy} = a\sigma_{xy} + bm_G$$

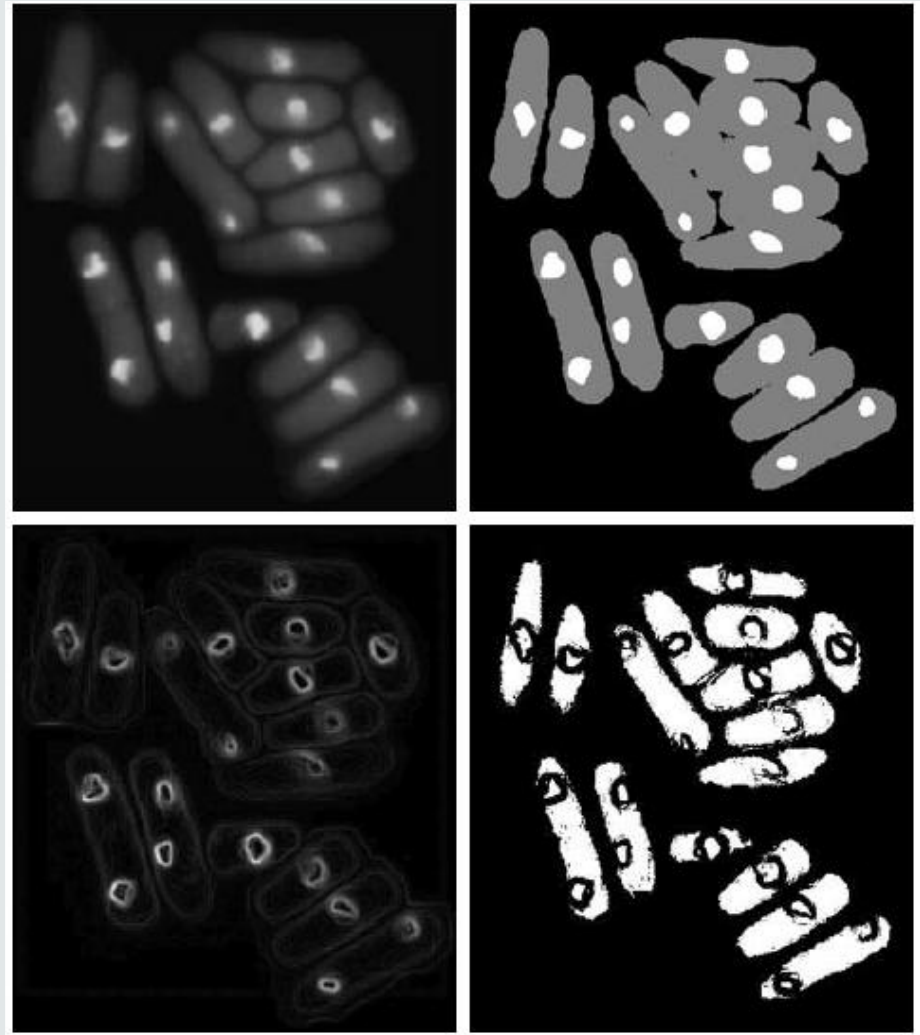
$$g(x, y) = \begin{cases} 1 & \text{if } f(x, y) > T_{xy} \\ 0 & \text{if } f(x, y) \leq T_{xy} \end{cases}$$

## VARIABLE THRESHOLDING

$$Q(\sigma_{xy}, m_{xy}) = \begin{cases} \text{true} & \text{if } f(x, y) > a\sigma_{xy} \text{ AND } f(x, y) > bm_{xy} \\ \text{false} & \text{otherwise} \end{cases}$$

$$g(x, y) = \begin{cases} 1 & \text{if } Q(\text{local parameters}) \text{ is true} \\ 0 & \text{if } Q(\text{local parameters}) \text{ is false} \end{cases}$$

# VARIABLE THRESHOLDING





## MOVING AVERAGE

$$\begin{aligned} m(k+1) &= \frac{1}{n} \sum_{i=k+2-n}^{k+1} z_i \\ &= m(k) + \frac{1}{n} (z_{k+1} - z_{k-n}) \end{aligned}$$

# MOVING AVERAGE

and ninety six between Stockley  
of Knox. And State of Tennessee  
Andrew Jackson of the County  
of Afton said of the other part  
said Stockley Donelson for A  
of the Sum of two thousand  
hand paid the receipt where  
both And by these presents  
all alien enfeoff And Confe  
Jackson his heirs And a  
certain tracts or parcels of La  
and over one thousand acre

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and ninety six between Stockley  
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Andrew Jackson of the County  
of Davidson said of the other part  
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hand paid the receipt where  
hath And by these presents  
full alien enfeof And confer  
Jackson his heirs And A  
certain traits or parcels of La  
said acres one thousand four  
and ninety six between Stockley  
of Knox. And State of Tennessee  
Andrew Jackson of the County  
of Davidson said of the other part  
said Stockley Donelson for A  
of the sum of two thousand  
hand paid the receipt where  
hath And by these presents  
full alien enfeof And confer  
Jackson his heirs And A  
certain traits or parcels of La  
said acres one thousand four

# MULTIVARIABLE THRESHOLDING

$$g = \begin{cases} 1 & \text{if } D(\mathbf{z}, \mathbf{a}) < T \\ 0 & \text{otherwise} \end{cases}$$

$$\begin{aligned} D(\mathbf{z}, \mathbf{a}) &= \|\mathbf{z} - \mathbf{a}\| \\ &= \left[ (\mathbf{z} - \mathbf{a})^T (\mathbf{z} - \mathbf{a}) \right]^{\frac{1}{2}} \end{aligned}$$

$$D(\mathbf{z}, \mathbf{a}) = \left[ (\mathbf{z} - \mathbf{a})^T \mathbf{C}^{-1} (\mathbf{z} - \mathbf{a}) \right]^{\frac{1}{2}}$$