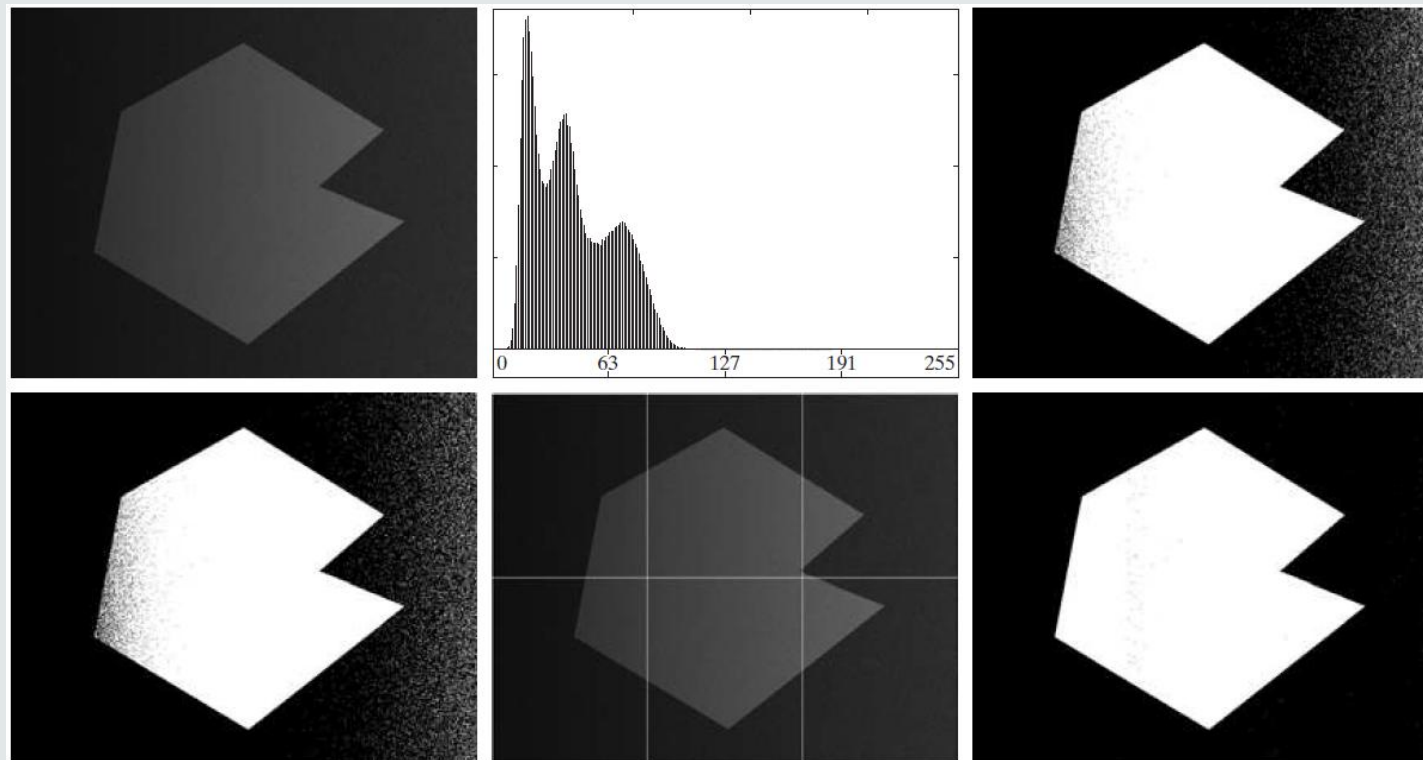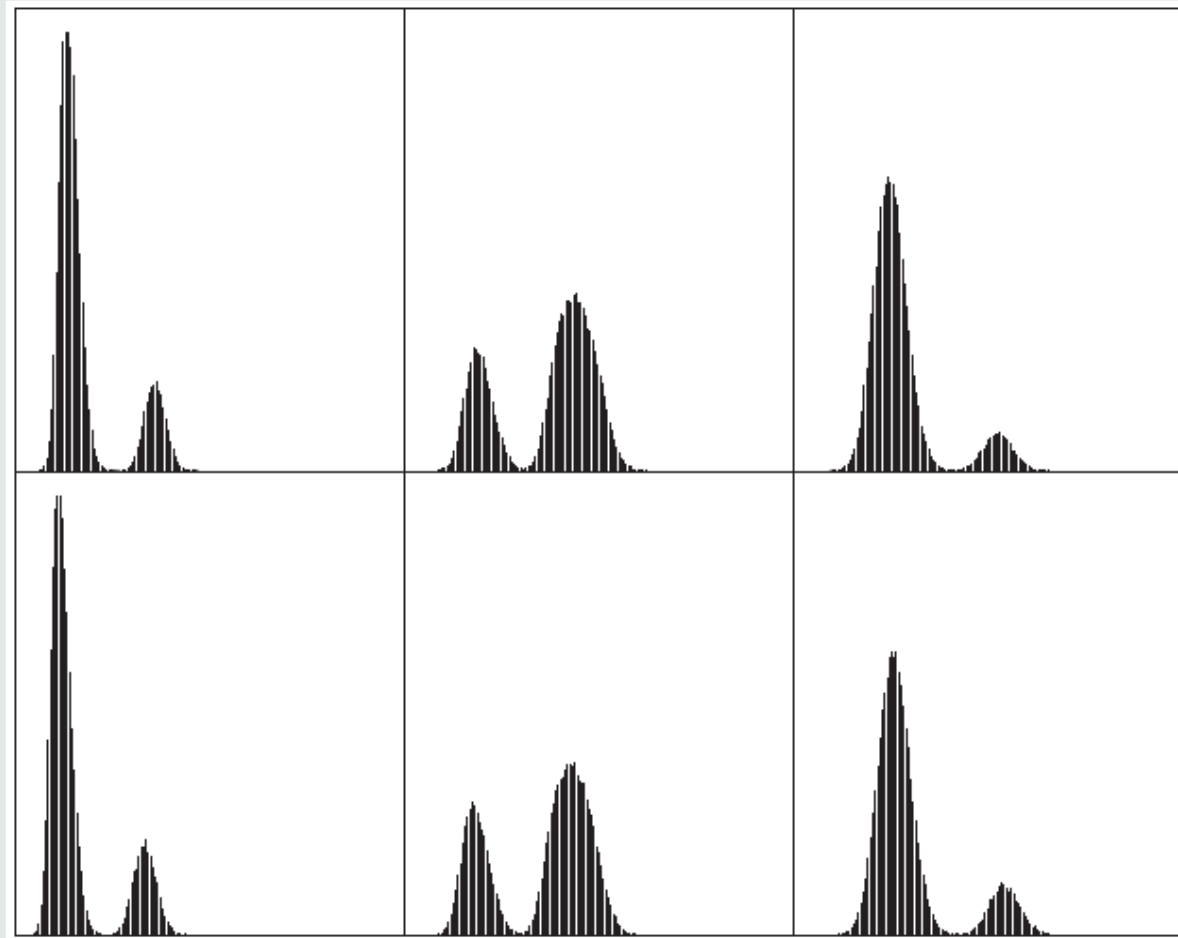# VARIABLE THRESHOLDING

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

- σ_{xy} and m_{xy} are standard deviation and mean value of the pixels in neighbourhood S_{xy}

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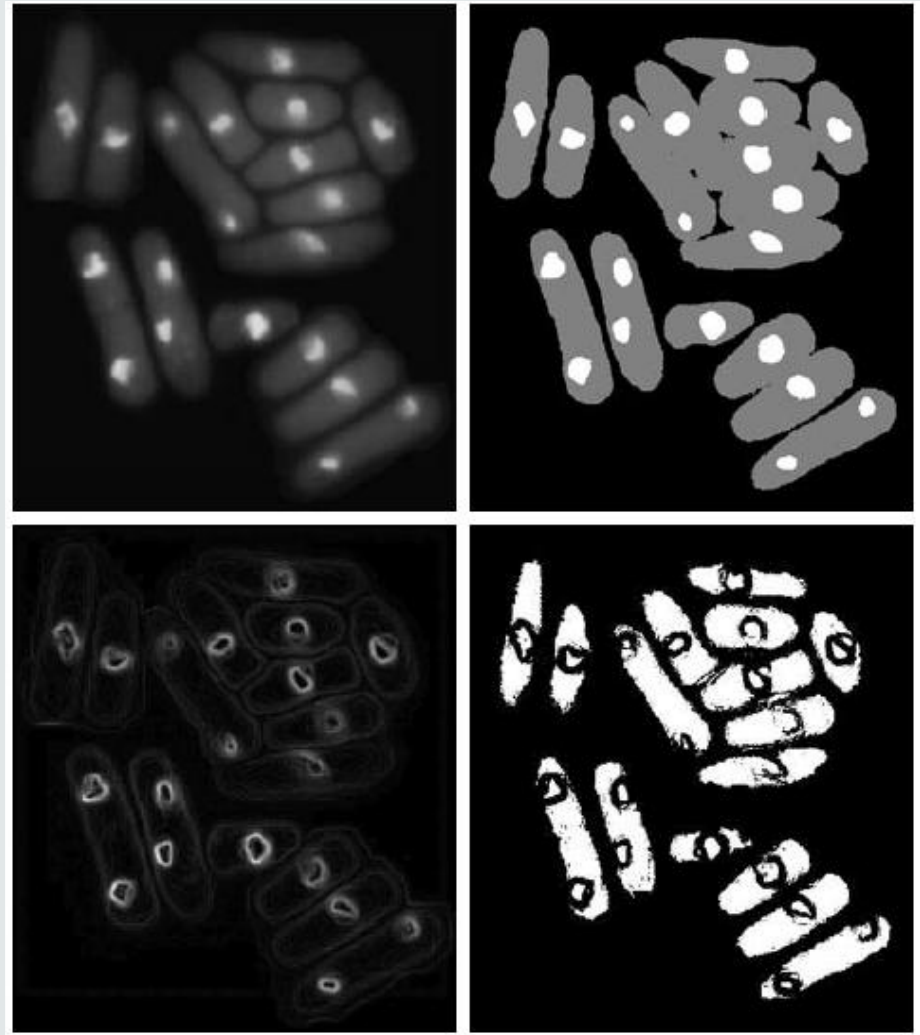
$$g(x, y) = \begin{cases} 1 & \text{if } f(x, y) > T_{xy} \\ 0 & \text{if } f(x, y) \leq T_{xy} \end{cases}$$

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

$$m(k + 1) = \frac{1}{n} \sum_{i=k+2-n}^{k+1} z_i$$

$$= m(k) + \frac{1}{n}(z_{k+1} - z_{k-n})$$

MOVING AVERAGE

MOVING AVERAGE

MULTIVARIABLE THRESHOLDING

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

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

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