

# Region moments

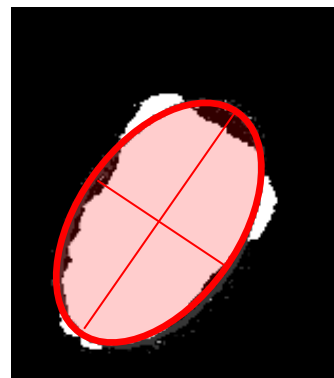
- Raw moments  $M_{pq} = \sum_{x,y \in \text{Region}} x^p y^q$

- Central moments

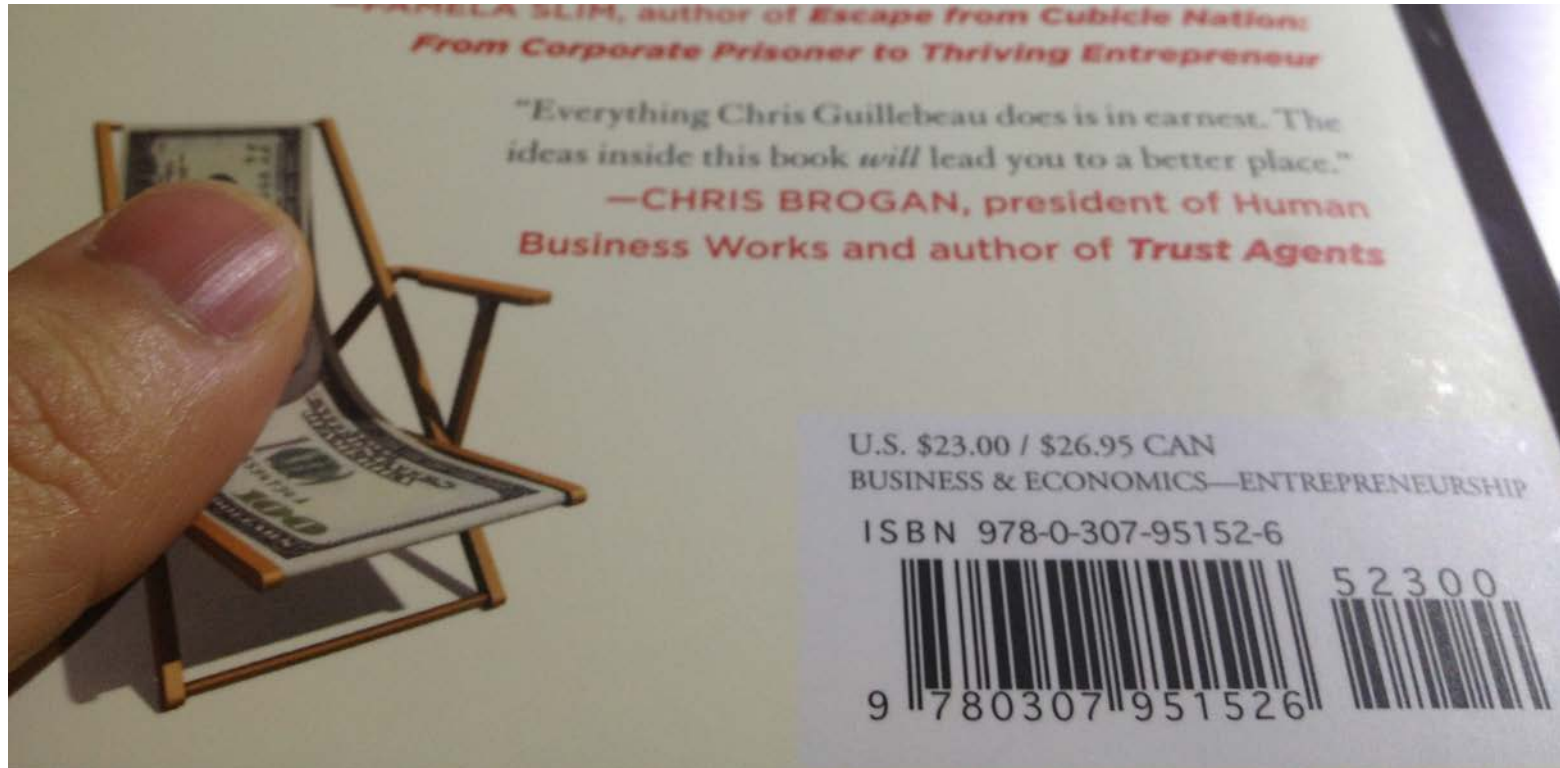
$$\mu_{pq} = \sum_{x,y \in \text{Region}} (x - \bar{x})^p (y - \bar{y})^q \quad \text{with } \bar{x} = \frac{M_{10}}{M_{00}} \text{ and } \bar{y} = \frac{M_{01}}{M_{00}}$$

- Region orientation and eccentricity:  
calculate eigenvectors of covariance

matrix  $\begin{bmatrix} \mu_{20} & \mu_{11} \\ \mu_{11} & \mu_{02} \end{bmatrix}$



# Example: Detecting bar codes

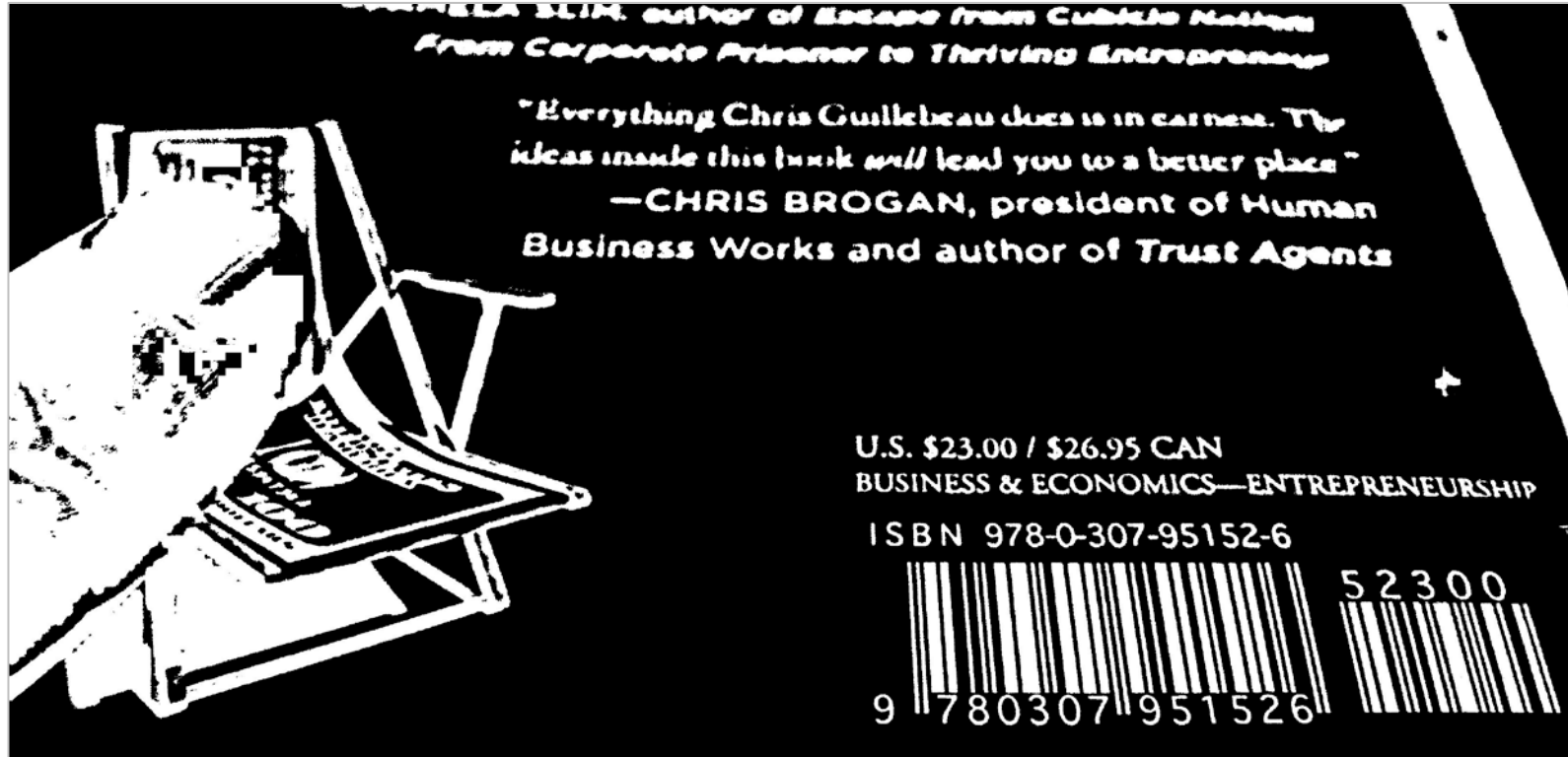


Original Image



# Example: Detecting bar codes

Locally adaptive  
thresholding



# Example: Detecting bar codes

Locally adaptive  
thresholding

Filtering by  
eccentricity



# Example: Detecting bar codes

Locally adaptive thresholding

Filtering by eccentricity

Filtering by major axis length



# Example: Detecting bar codes

Locally adaptive  
thresholding

Filtering by  
eccentricity

Filtering by major  
axis length

Filtering by  
orientation

