

Tema 18

Segmentación



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Umbralización

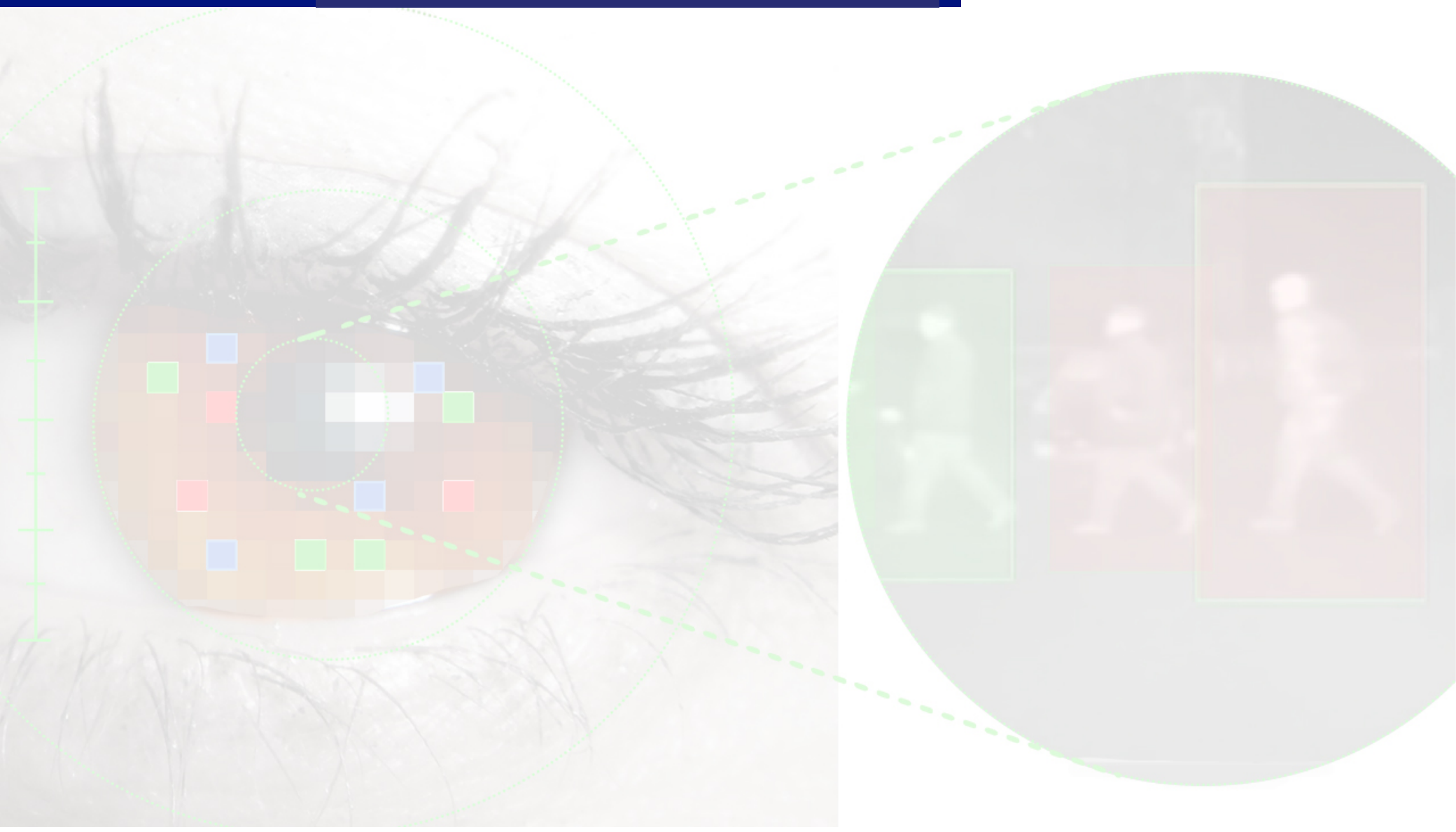


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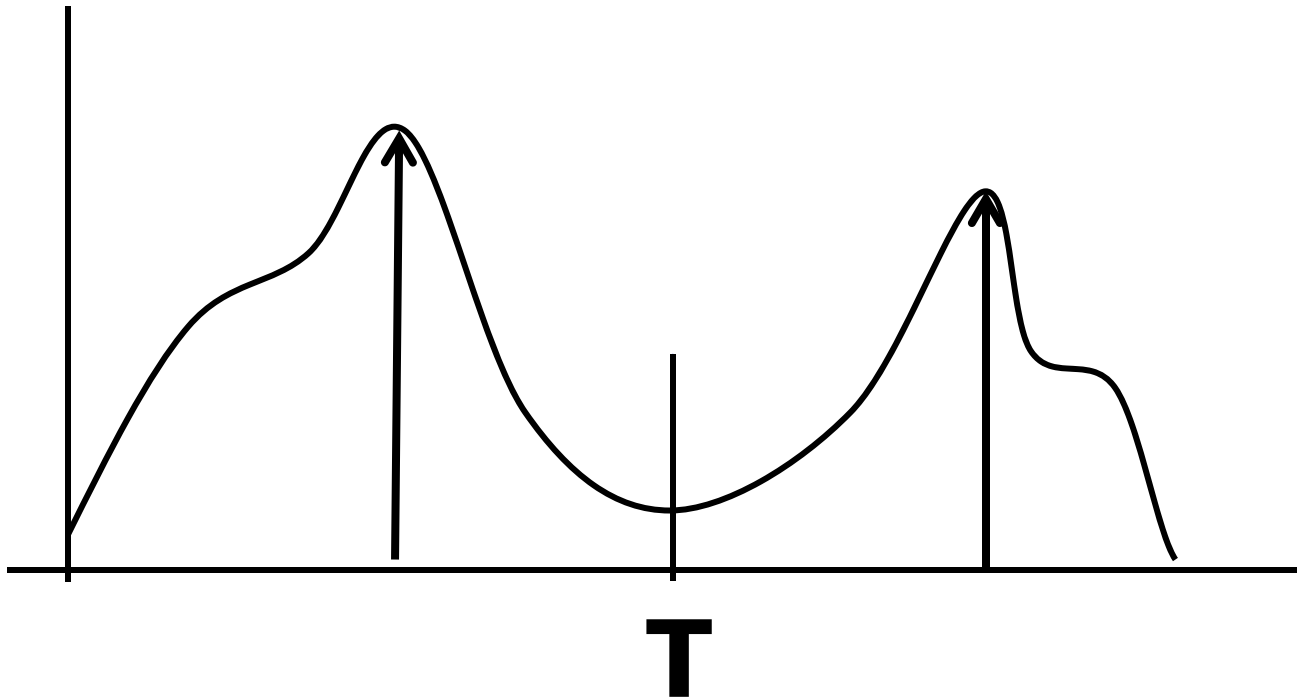
◆ Fundamentos

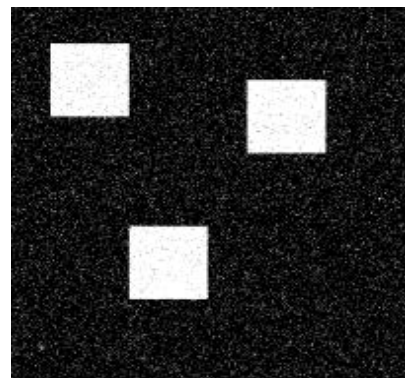
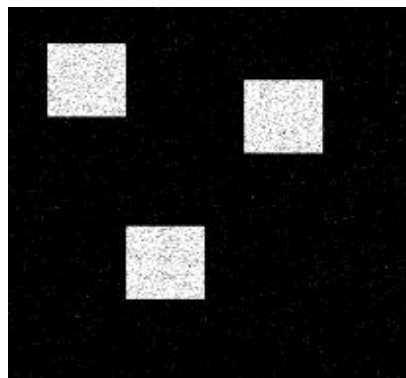
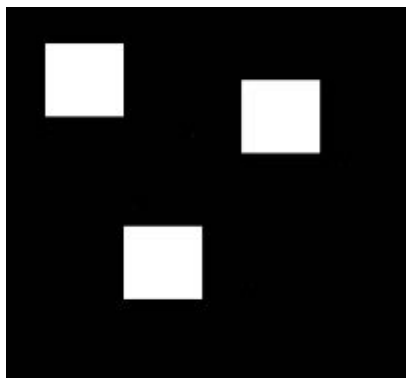
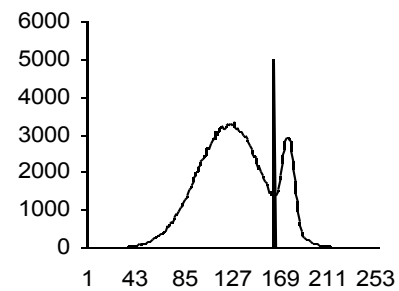
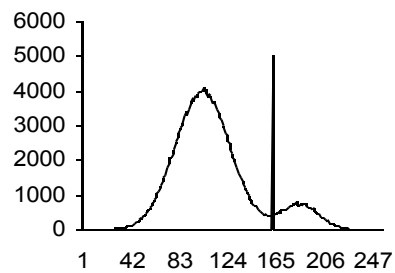
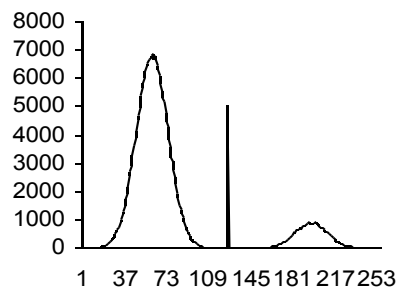
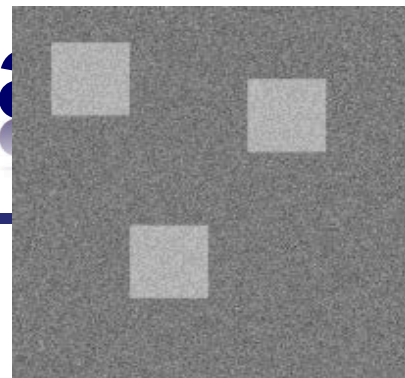
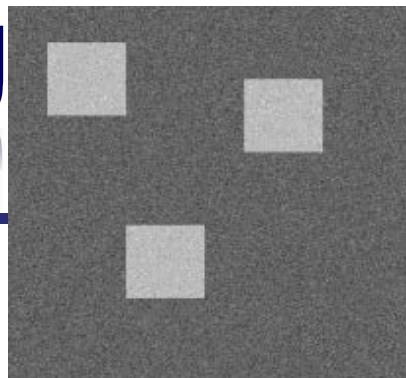
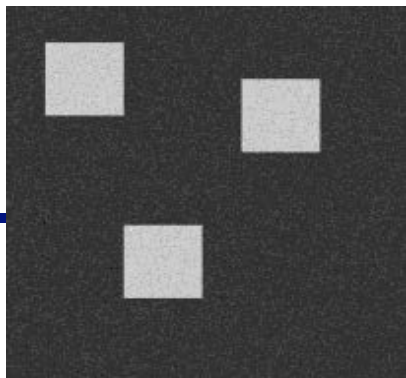
- ❖ Discontinuidad
 - ✓ Los objetos destacan del entorno y tienen por tanto unos bordes definidos
- ❖ Similitud
 - ✓ Cada uno de los elementos tiene propiedades parecidas de color, textura, etc.
- ❖ Conectividad
 - ✓ Los píxeles tienen que estar agrupados

$$g(x, y) = \begin{cases} 1 & T \leq f(x, y) \\ 0 & \text{en cualquier otro caso} \end{cases}$$

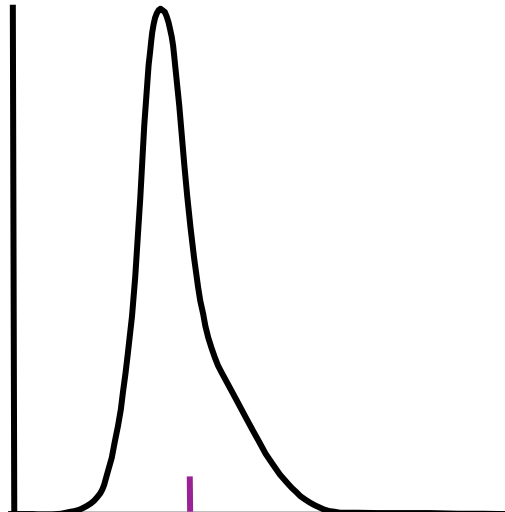
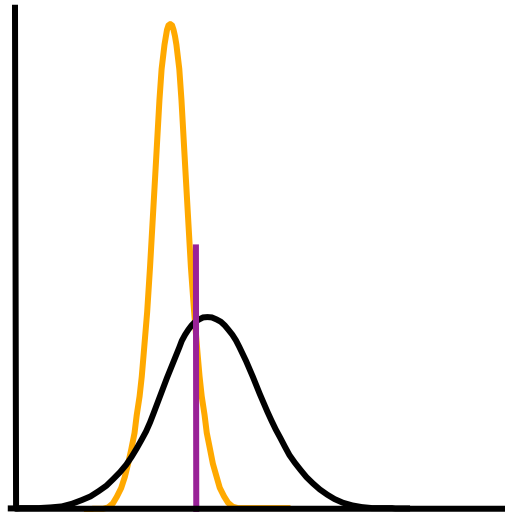
¿Cuál es el valor de T?

Umbralización

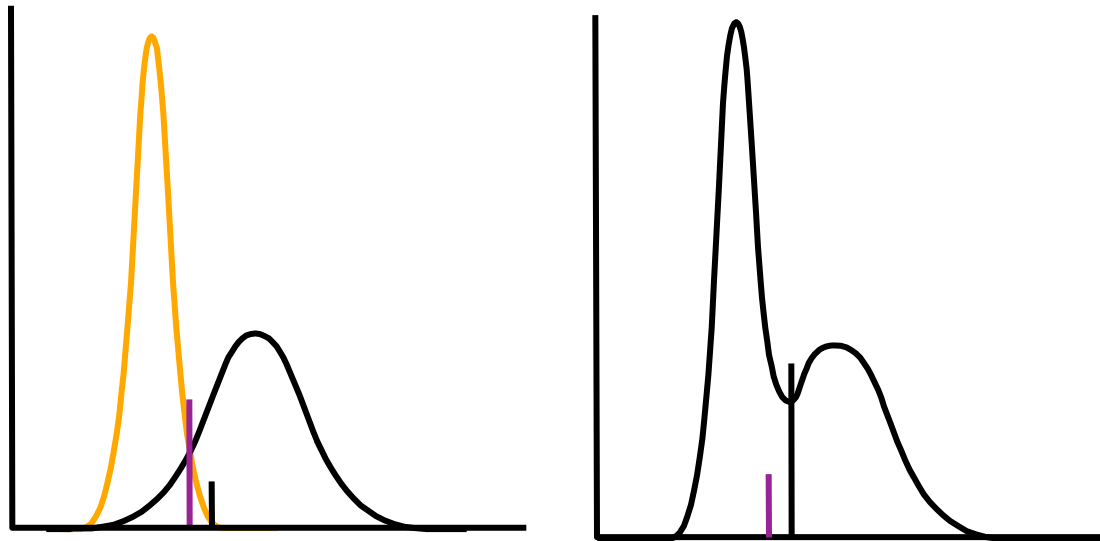




Umbralización



Umbralización



◆ Kittle-Illingworth

$$q_1(t) = \sum_{i=1}^t P(i)$$

$$q_2(t) = \sum_{i=t+1}^I P(i)$$

$$\mu_1(t) = \sum_{i=1}^t i \frac{P(i)}{q_1(t)}$$

$$\mu_2(t) = \sum_{i=t+1}^{I_t} i \frac{P(i)}{q_2(t)}$$

$$\sigma^2_1 = \sum (i - \mu_1(t))^2 \frac{P(i)}{q_1(i)} \quad \sigma^2_2 = \sum (i - \mu_2(t))^2 \frac{P(i)}{q_2(i)}$$

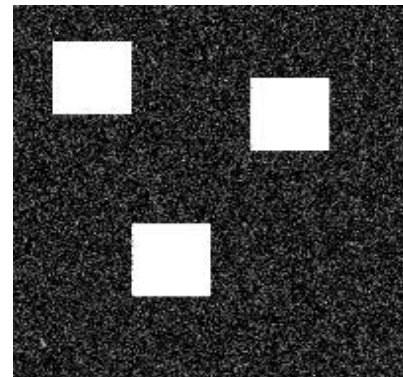
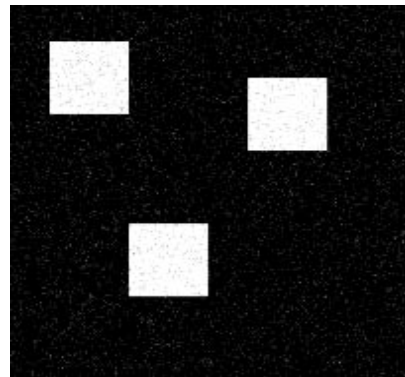
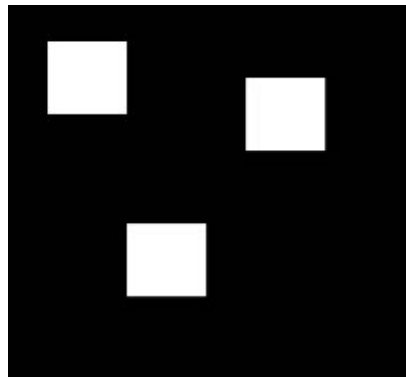
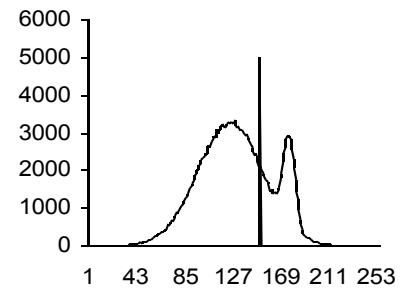
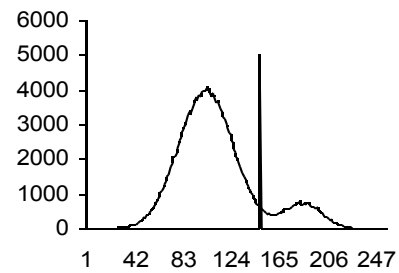
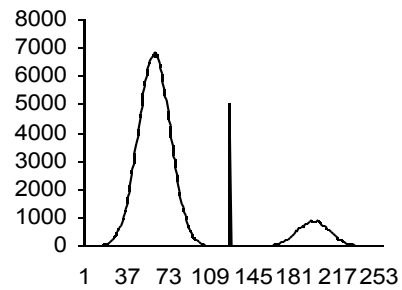
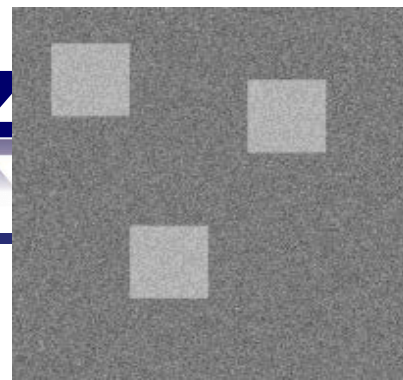
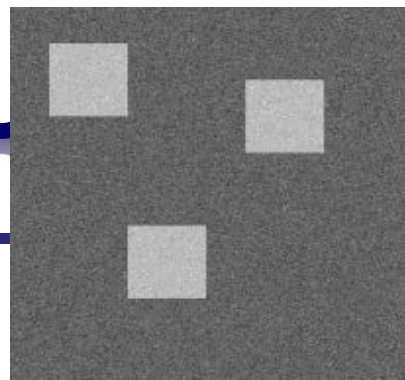
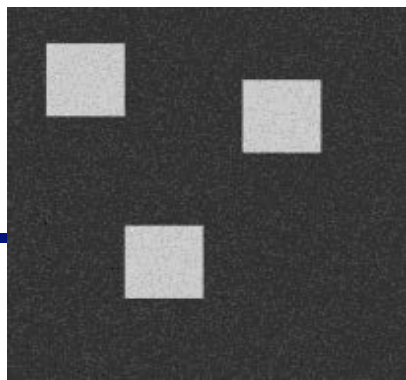
◆ Kittle-Illingworth

- ❖ Toma dos probabilidades de que aparezca un nivel de gris en la imagen
 - ✓ $P(i)$ Histograma de la imagen real
 - ✓ $f(i)$ Histograma si fuera la suma de dos gaussianas

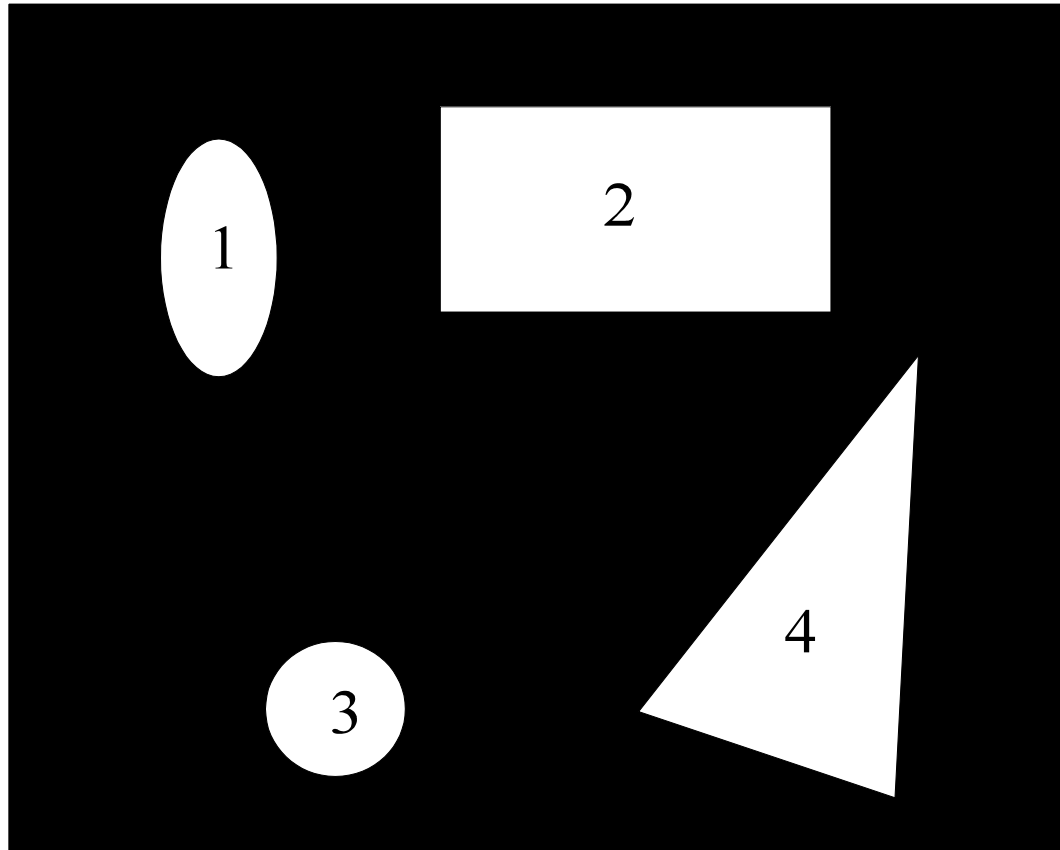
$$f(i) = \frac{q_1}{\sqrt{2\pi}\sigma_1} e^{-\frac{1}{2}\left(\frac{i-\mu_1}{\sigma_1}\right)^2} + \frac{q_2}{\sqrt{2\pi}\sigma_2} e^{-\frac{1}{2}\left(\frac{i-\mu_2}{\sigma_2}\right)^2}$$

- ◆ J representa el coste de equivocarse al tomar f en lugar de P
- ◆ Hay que encontrar el valor que lo minimiza.

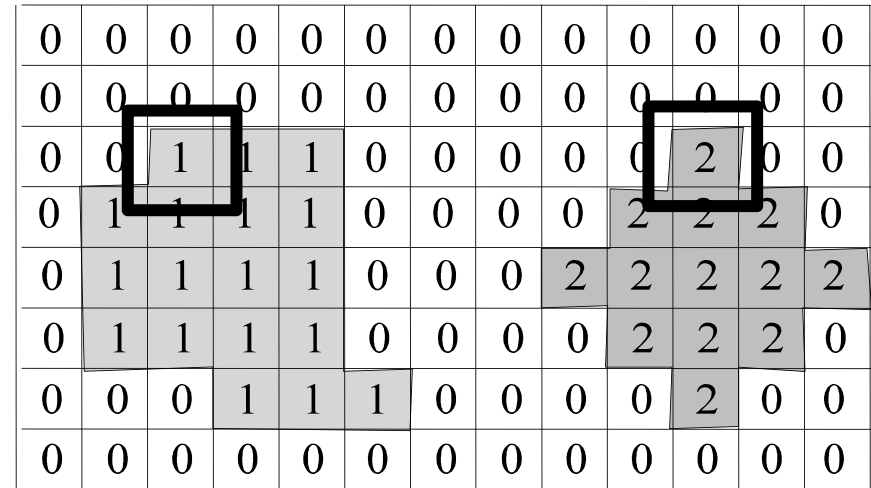
$$J = \sum_{i=1}^I P(i) \log \frac{P(i)}{f(i)}$$



Etiquetado (blob labelling)



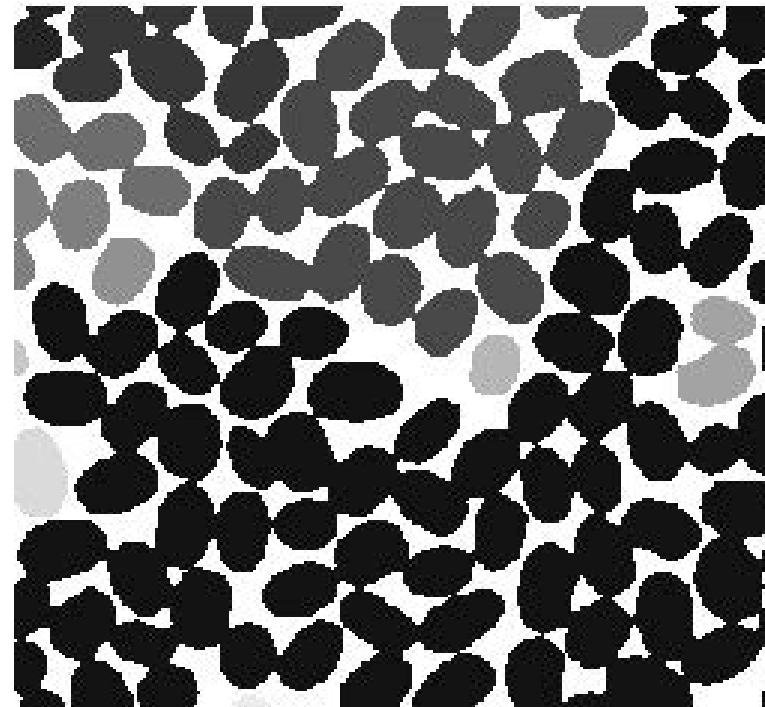
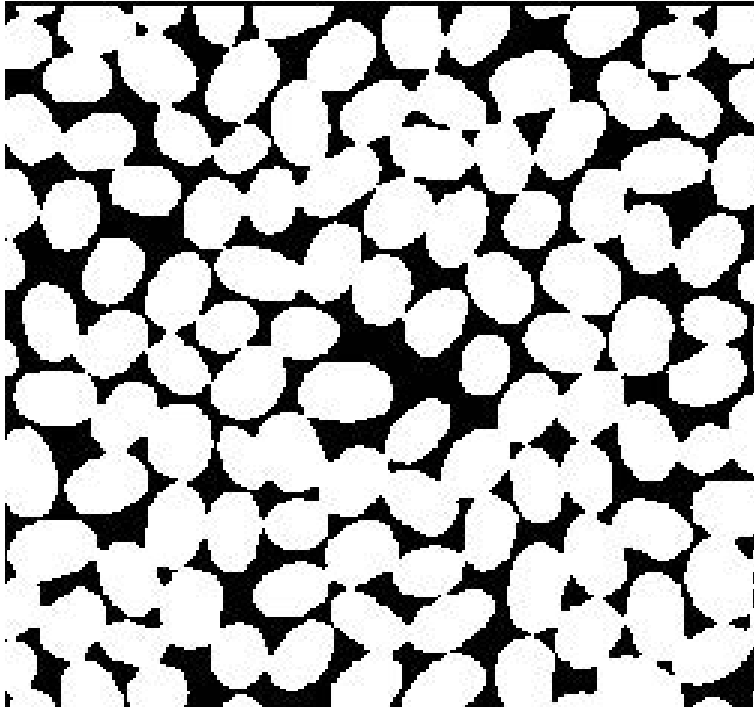
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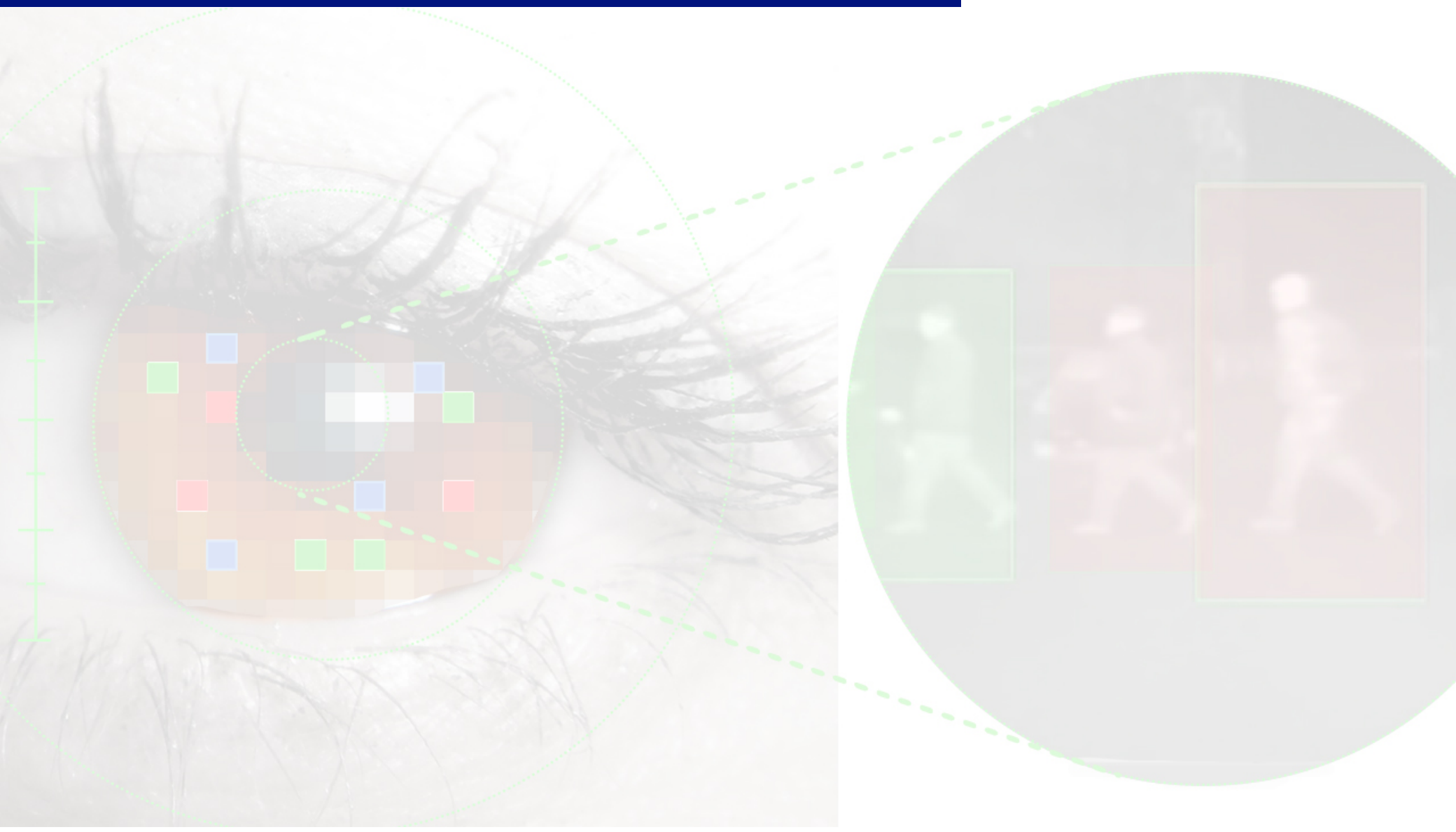
[illegible]

Etiquetado (blob labelling)



¿Qué es la Visión por computador?

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Introducción a la Visión por Computador: desarrollo de aplicaciones con OpenCV

Arturo de la Escalera Hueso
José Maria Armingol Moreno

Fernando García Fernández
David Martín Gómez
Abdulla Al Kaff

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Universidad Carlos III de Madrid



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