



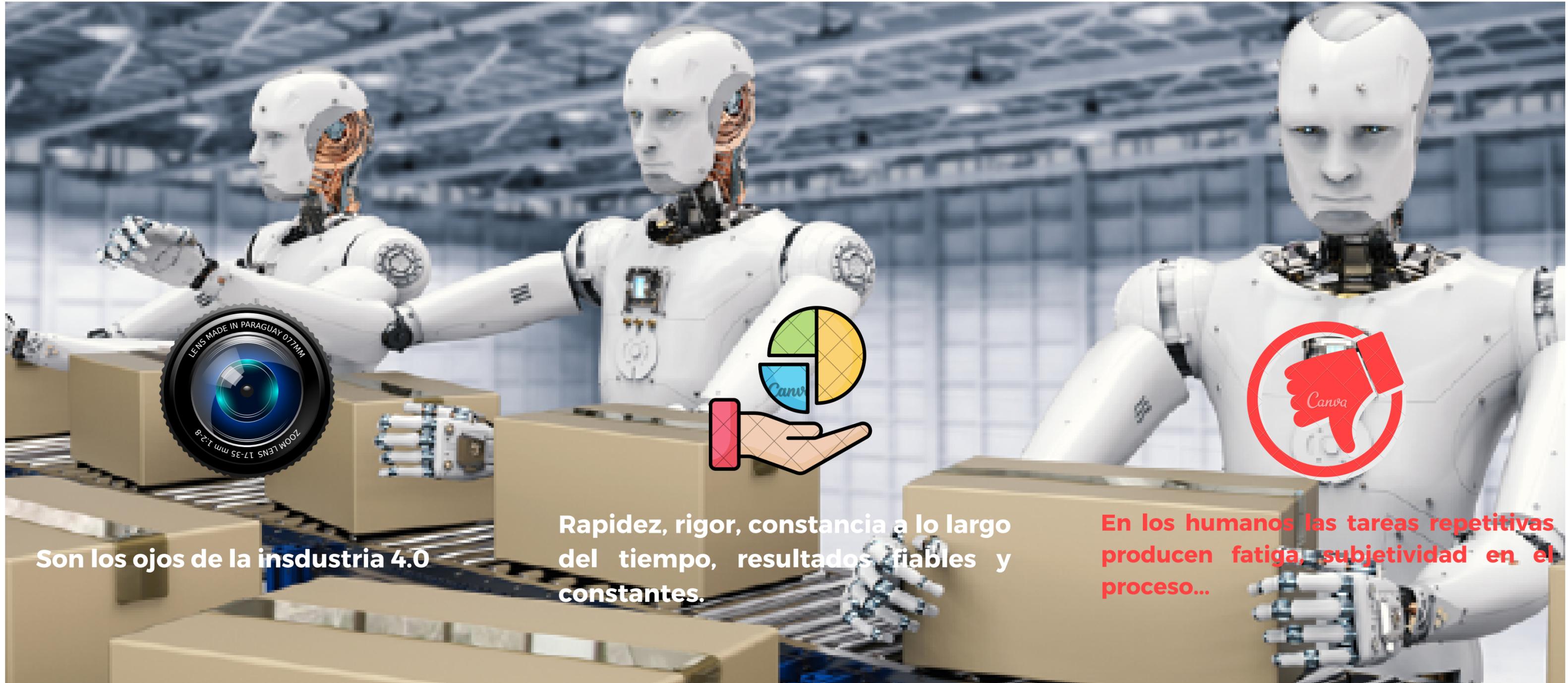
PICVISA

Fòrum Indústria 4.0

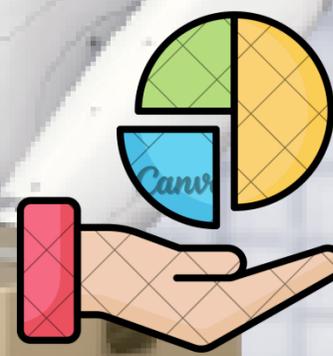
Visió artificial

#bettersorting

Qué es la visión artificial?



Son los ojos de la industria 4.0

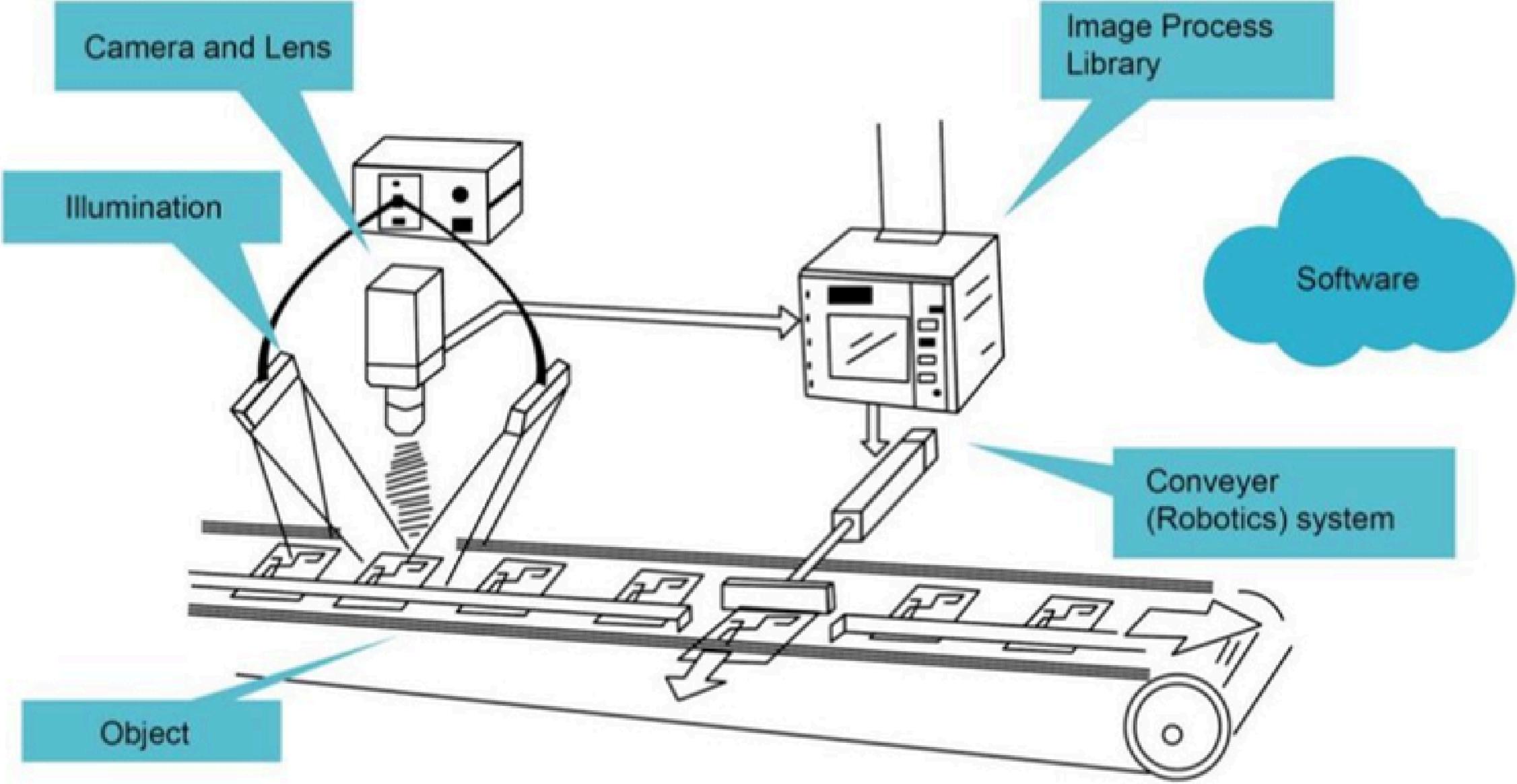


Rapidez, rigor, constancia a lo largo del tiempo, resultados fiables y constantes.

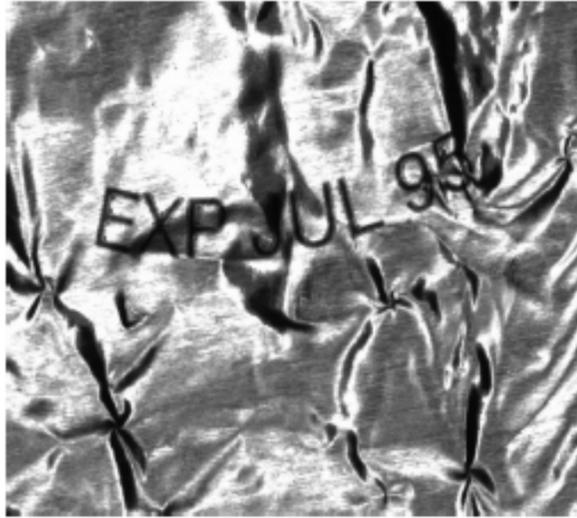


En los humanos las tareas repetitivas producen fatiga, subjetividad en el proceso...

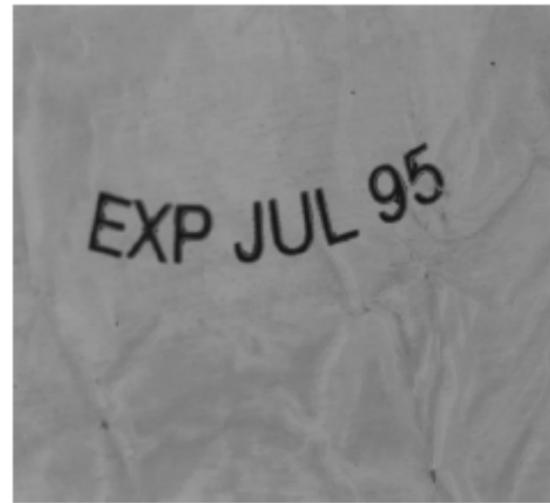
Montaje tipo de visión artificial



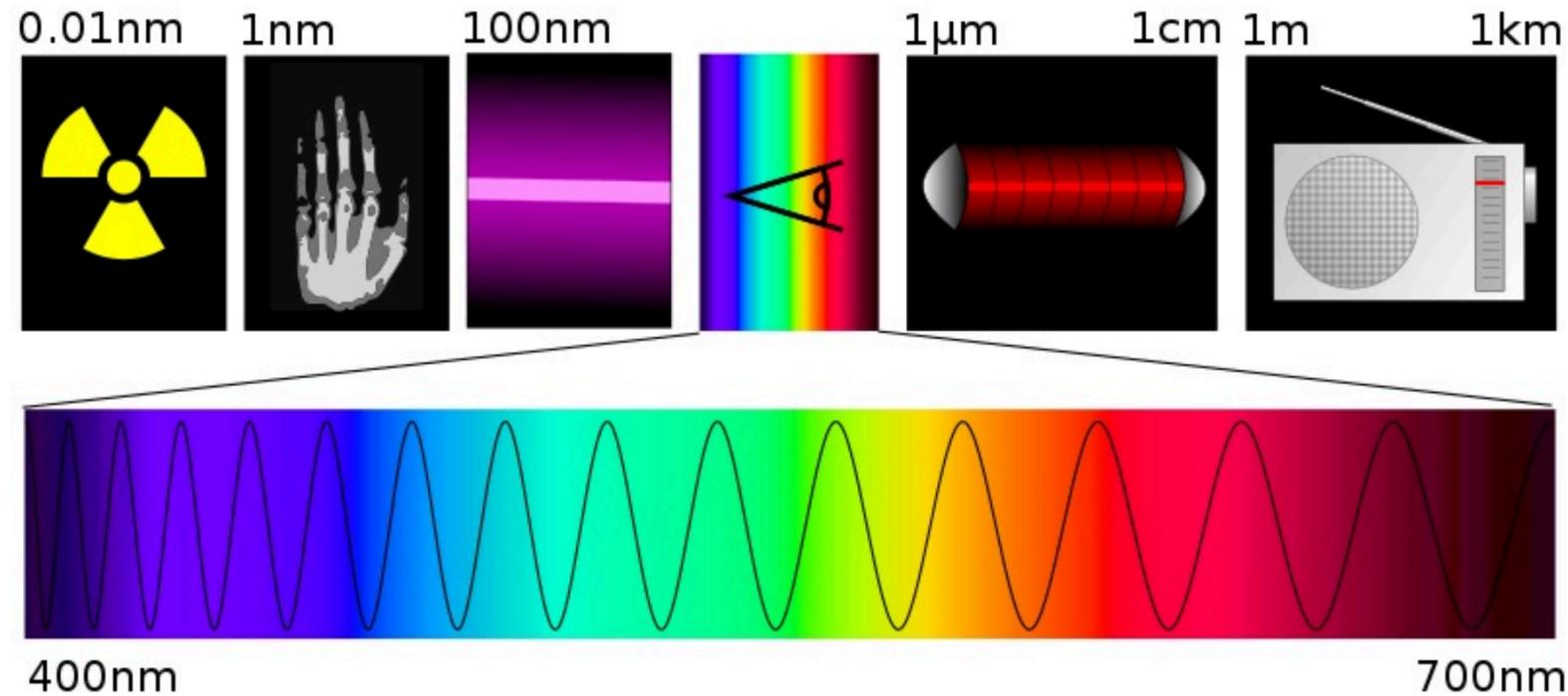
La importancia de la iluminación

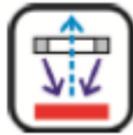
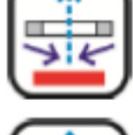


Sin iluminación

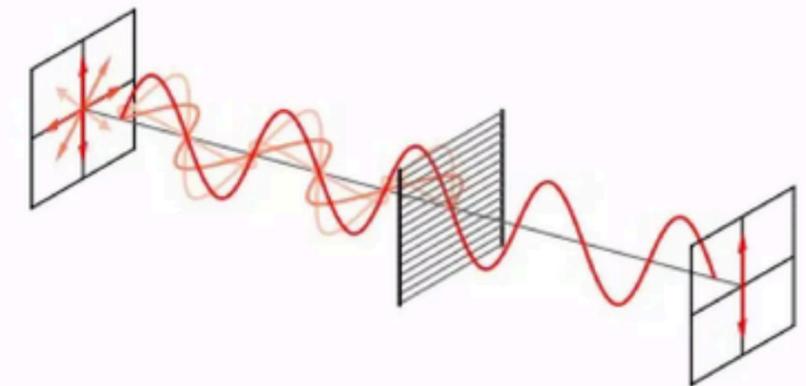
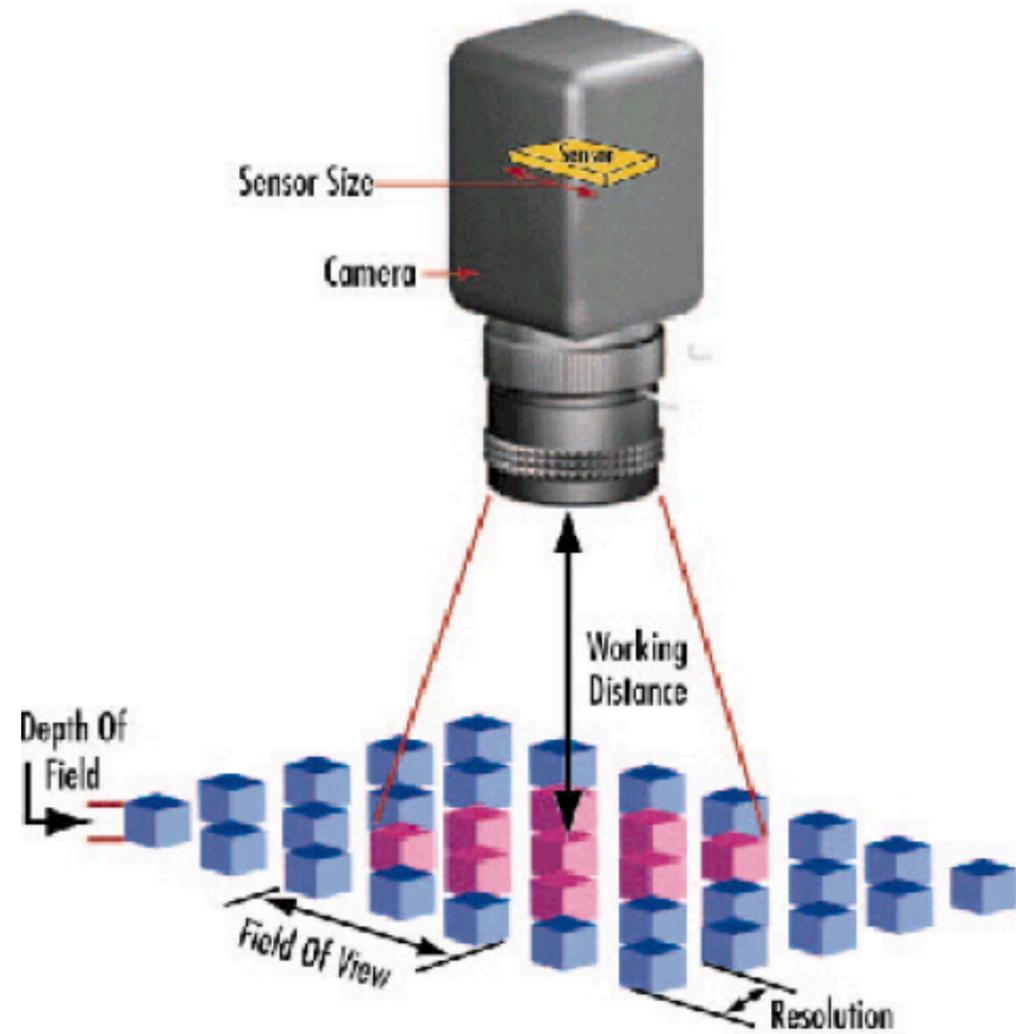


Con iluminación

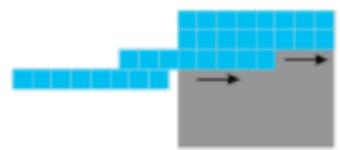
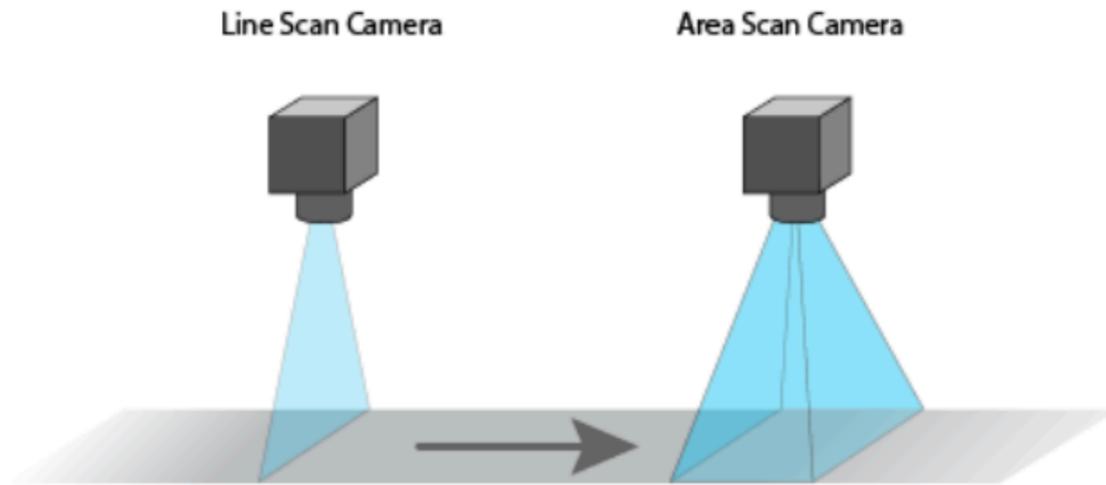


-  ILUMINACIÓN RADIAL
-  PROYECTOR DE LUZ
-  ILUMINACIÓN POSTERIOR
-  ILUMINACIÓN EFECTO 'Campo brillante'
-  ILUMINACIÓN EFECTO 'Campo oscuro'
-  ILUMINACIÓN EFECTO 'Día nublado'
-  ILUMINACIÓN AXIAL

La lente y los filtros



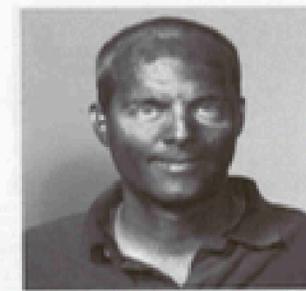
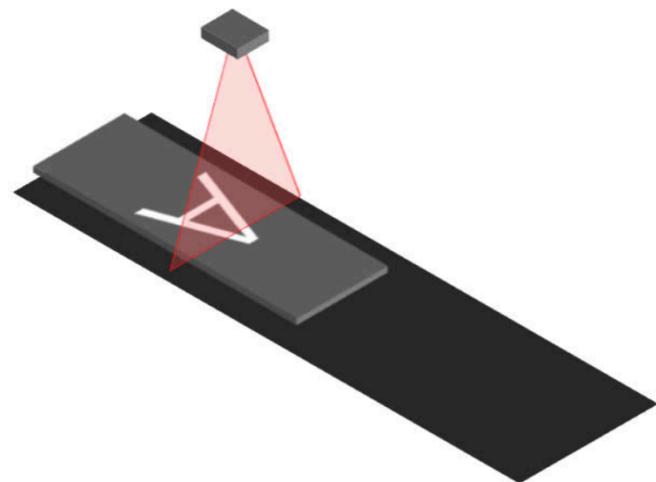
El sensor y la cámara



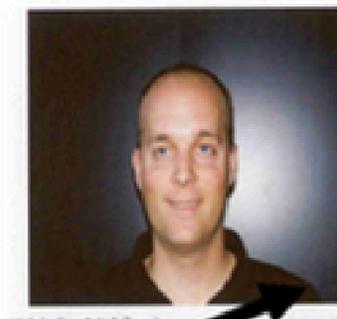
Captures pixels line by line



Captures all pixels in a block



Near-infrared ($\lambda = 0.75-0.9 \mu\text{m}$) (Courtesy of Intel)



Visible ($\lambda = 0.4-0.7 \mu\text{m}$)



Shortwave infrared ($\lambda = 0.9-1.6 \mu\text{m}$)



Midwave infrared ($\lambda = 3-5 \mu\text{m}$)



Longwave infrared ($\lambda = 8-14 \mu\text{m}$)

Gamma Rays $<0.01 \text{ nm}$	X Rays $0.01-10 \text{ nm}$	Ultra-Violet $10-400 \text{ nm}$	Visible $400-750 \text{ nm}$
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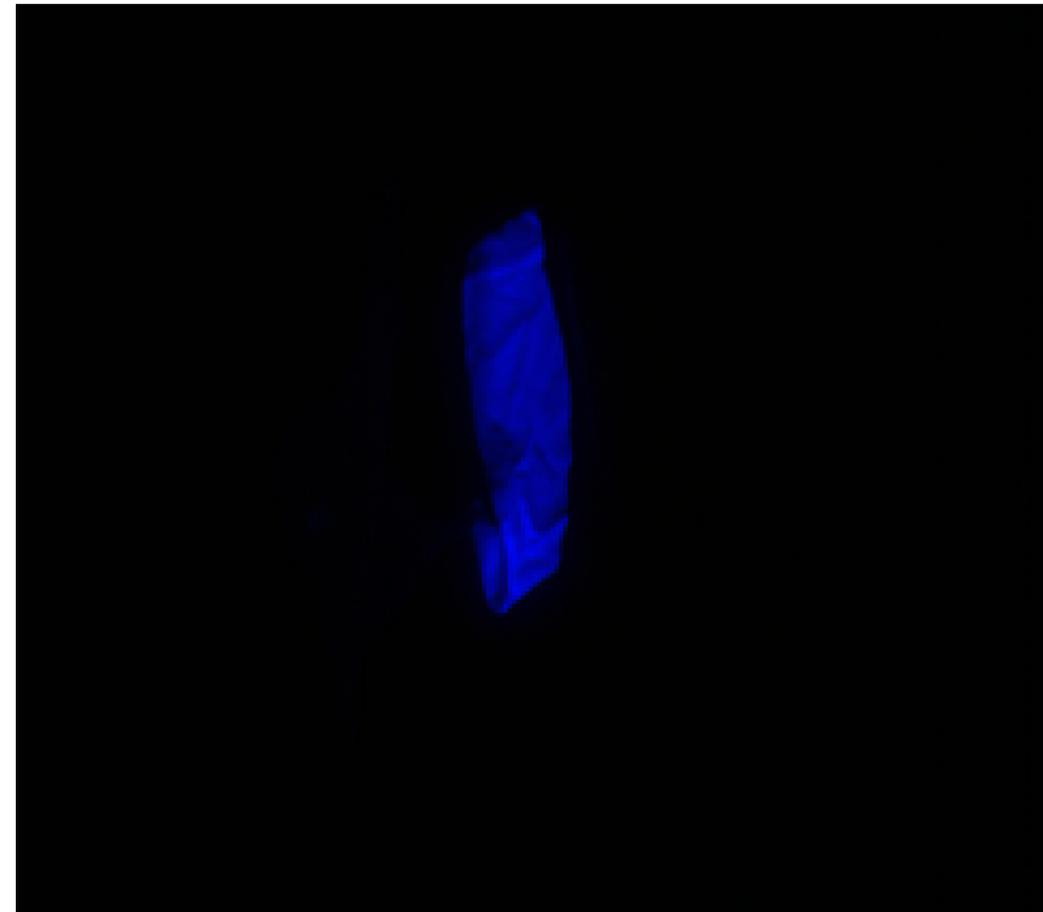
Visible $0.4 - 0.75 \mu\text{m}$	Near-IR $0.75-1.1 \mu\text{m}$	SWIR $1.1-2.5 \mu\text{m}$	MWIR $2.5-7 \mu\text{m}$	LWIR $7-15 \mu\text{m}$
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Ejemplo visión artificial con luz UV

Con luz visible

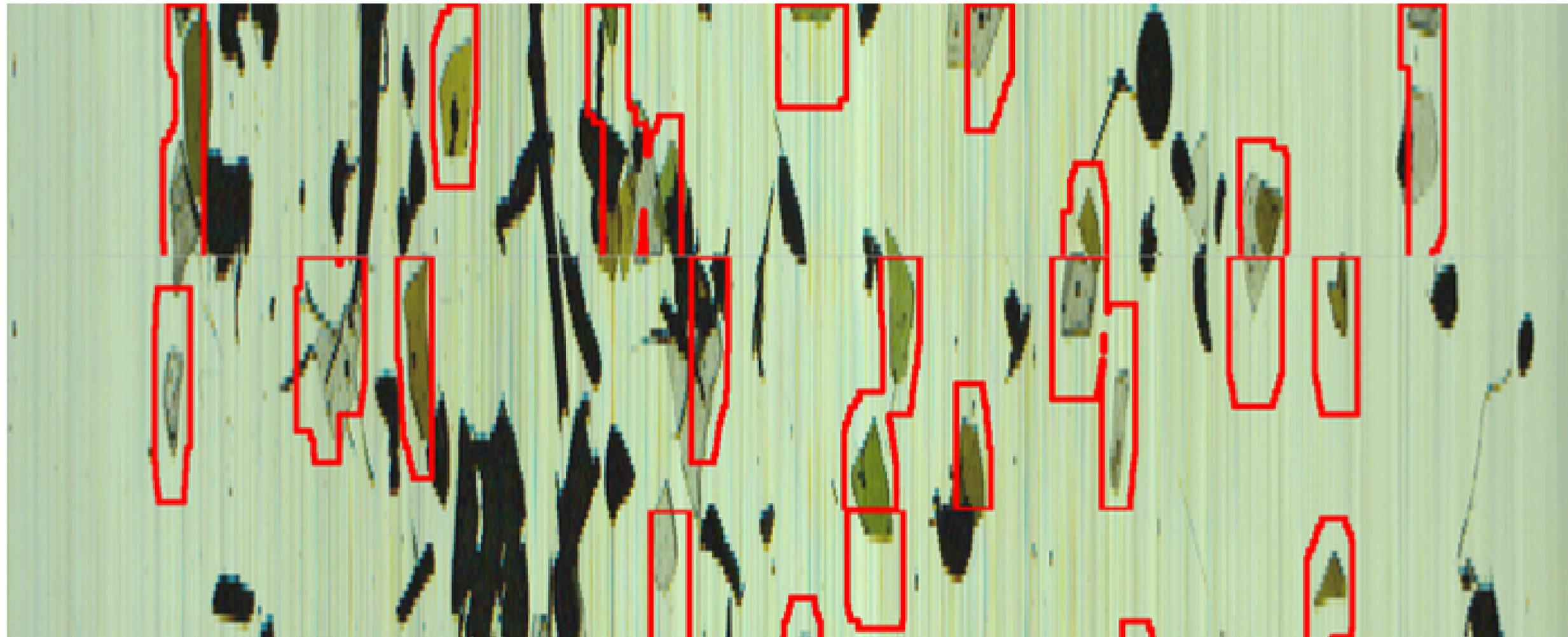


Con luz UV



Ejemplo visión artificial con backlight

Imagen RGB con backlight blanco



Ejemplo imagen hiperespectral

Imagen visible

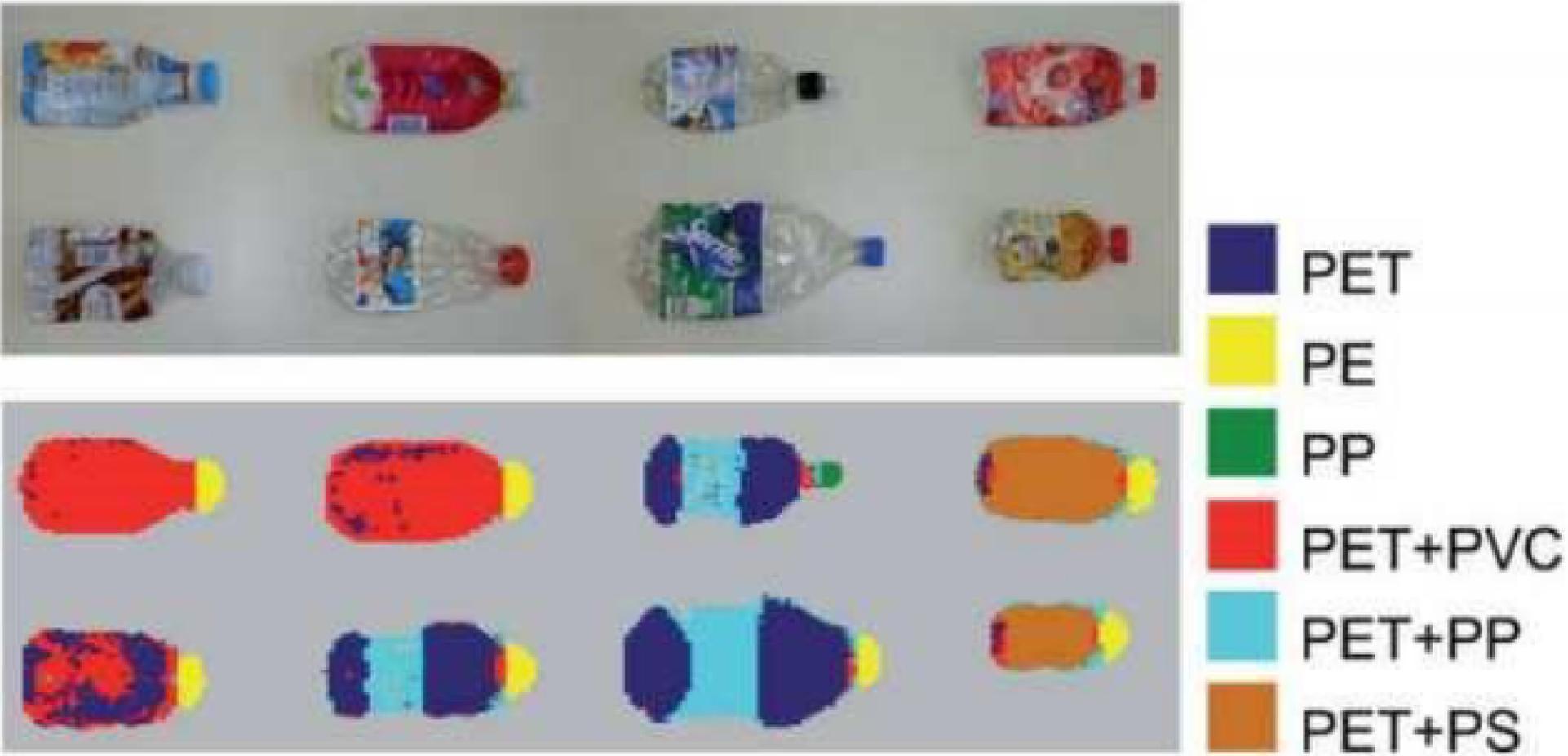
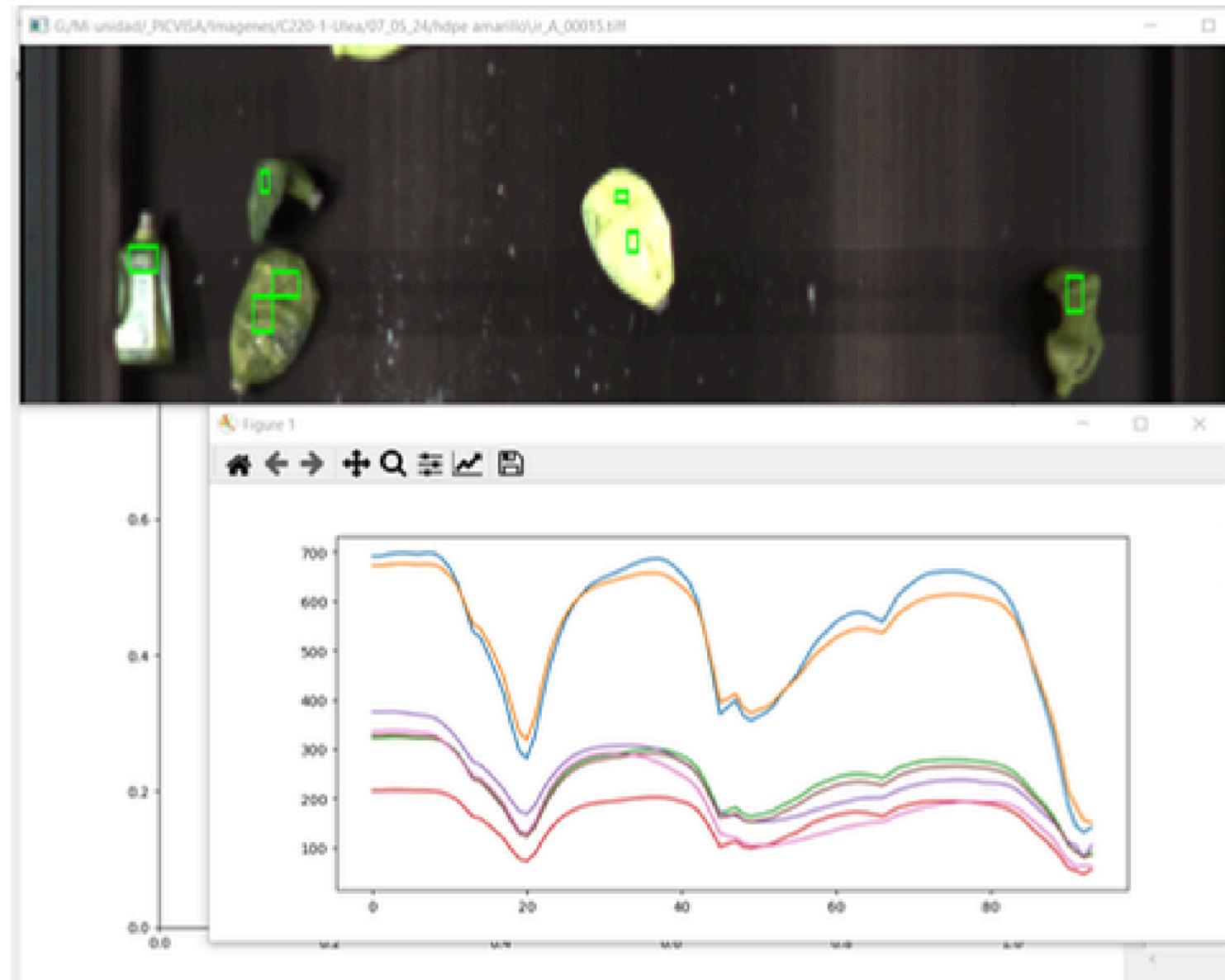


Imagen hiperespectral

Ejemplo imagen hiperespectral

Imagen “visible”

Respuesta espectral



¡MUCHAS GRACIAS!

PIC  ISA