

Semillero de Investigación “Hands - on” Computer Vision

Disclaimer

El material utilizado en este semillero fue extraído de diferentes fuentes disponibles en internet. Se usaron cursos y repositorios de diferentes universidades (MIT, Stanford, Berkeley, Brown, Toronto, entre otras) y profesores. Intentamos dar créditos correctamente según correspondía, pero quizás omitimos algunos por error.

Si al revisar el material encuentras que no estamos dando el correcto crédito a alguna imagen, frase o video, te agradecemos nos lo hagas saber inmediatamente. Agradecemos tu comprensión y apoyo en este proceso de construir comunidad y diseminar el conocimiento.

Hands on Computer Vision Team

About me!

Formación Académica

- Ingeniería de Sistemas (UIS, '04 - '09)
- MSc. Ingeniería de Sistemas e Informática (UIS, '10 - '12)
- MSc. Ingeniería Eléctrica y Computación (UDel, '12 - '15)
- PhD. Ingeniería Eléctrica y Computación (UDel, '12 - '17)
- Postdoc (UIS, '18 - '20) (BU, '21 - '22)

Honores

- Estudiante distinguido de pregrado (UIS, 2006-2008)
- Tesis meritoria de maestría (UIS, 2012)
- Beca para doctorado (Colciencias-Fulbright, 2012-2017)
- Mejor disertación (UDel, 2017)

Publicaciones

- 30 artículos en revistas de alto impacto
- 40 ponencias en eventos internacionales, 1 capítulo de libro

Áreas de Investigación

- Computational & optical imaging
- Hyperspectral imaging (VIS/IR)
- Single photon imaging & Numerical optimization



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About the HoCV Team!



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Estudiante de Ingeniería de Sistemas e
Informática

About the HoCV First Cohort (50/103)

Aceptados

Otro

4.0%

Física

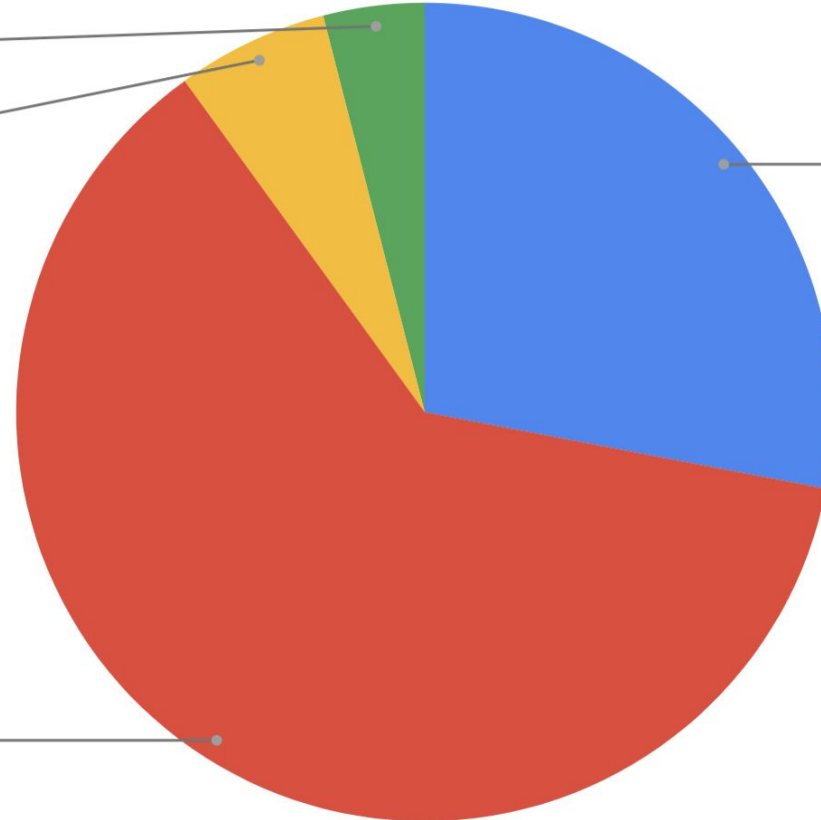
6.0%

Ingeniería Electrónica

28.0%

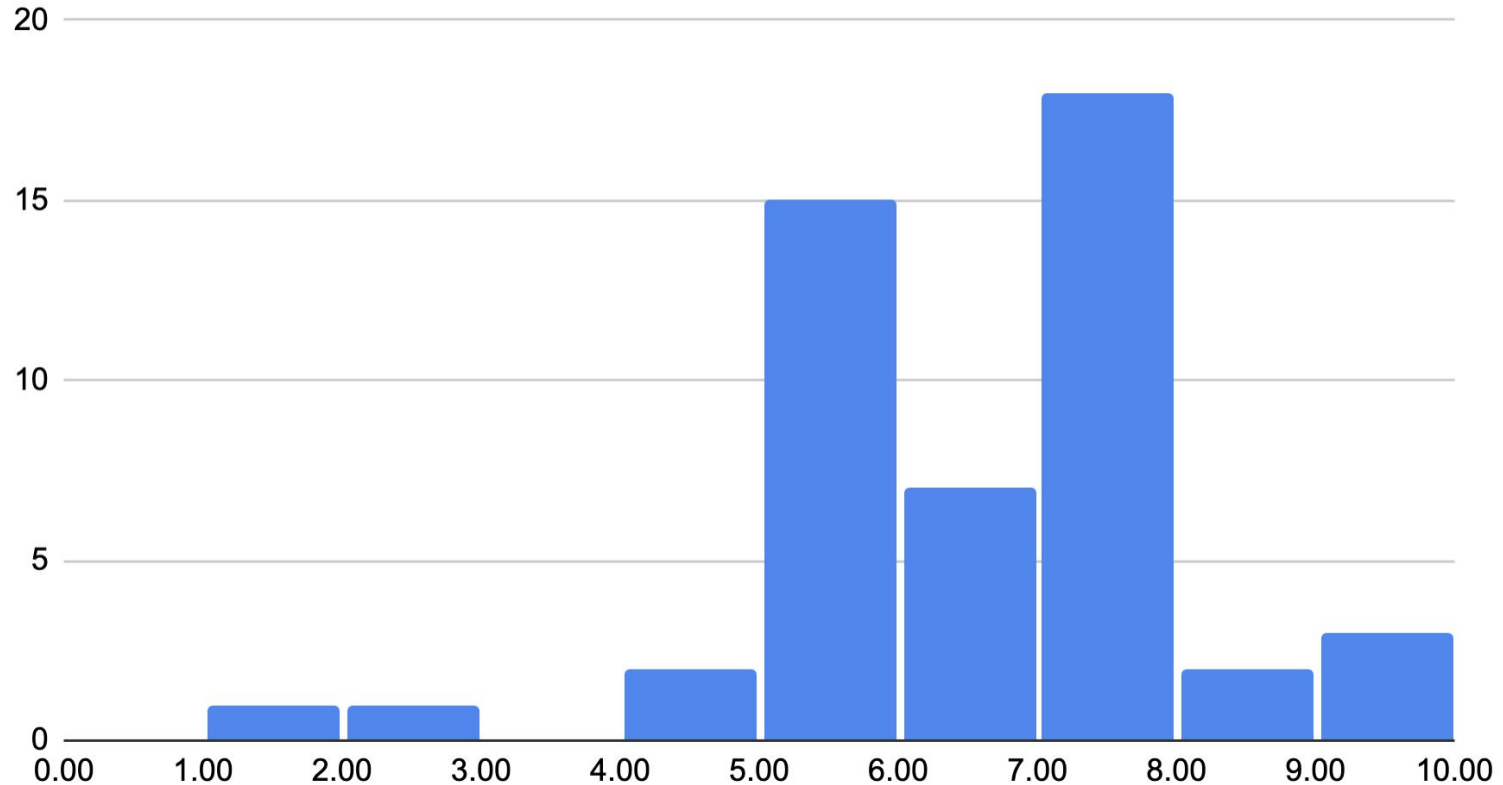
Ingeniería de Sistemas

62.0%



About the HoCV First Cohort (50/103)

Aceptados



Objetivos



Impulsar la formación y desarrollo de nuestros estudiantes en temas de **interés mundial**

Saber qué está pasando tras bambalinas y cómo funciona la tecnología basada en **CV e IA**

Dar a conocer áreas de acción **interdisciplinar** que demanda la industria actual

Hacer de esta, una experiencia **Hands-On** (y “gratis”)

Fomentar un espacio diferente, te debes sentir diferente, saca tu potencial.
“Debes ser el mejor”

Armar grupo de trabajo en CV: proyectos, investigación, artículos, conferencias, pasantías.
¡Crear comunidad!

Sesiones

**SESIÓN 1:
PILOT**

**SESIÓN 2:
DE FOTONES A
PIXELES**

**SESIÓN 3:
DEEP LEARNING**

**SESIÓN 4:
IMÁGENES
ESPECTRALES**

**SESIÓN 5:
DEPTH PASIVO**

**SESIÓN 6:
DEPTH ACTIVO**

**SESIÓN 7:
SEGMENTACIÓN**

**SESIÓN 8:
IMÁGENES
TÉRMICAS**

**SESIÓN 9:
TINYML**

**SESIÓN 10:
PROYECTOS**

Cronograma

| Fecha | Título | Descripción |
|----------|---|---|
| Marzo 4 | Piloto | Esta sesión es introductoria al semillero en general |
| Marzo 11 | De fotones a píxeles | Generalidades sobre la adquisición y procesamiento digital de imágenes |
| Marzo 18 | Deep Learning | Despierta el poder de la inteligencia artificial en la visión por computadora |
| Abril 1 | Imágenes espectrales | Conoce los secretos que hay mas allá de una imagen de color |
| Abril 8 | Estimación pasiva de la profundidad | Explora las técnicas de estimación de profundidad sin fuentes externas |
| Abril 15 | Estimación activa de la profundidad | Extrayendo profundidad con precisión milimétrica a partir de la luz |
| Abril 22 | Segmentación | Delineando el mundo digital a través de píxeles clasificados meticulosamente |
| Abril 29 | Imágenes térmicas | El mundo visto a través del calor |
| Mayo 6 | TinyML | Inteligencia artificial en la palma de tu mano |
| Mayo 20 | Proyectos | Desafía tus habilidades 🚀🚀 |

¿Evaluación?

**“Demuestra que
quieres ser el mejor”**

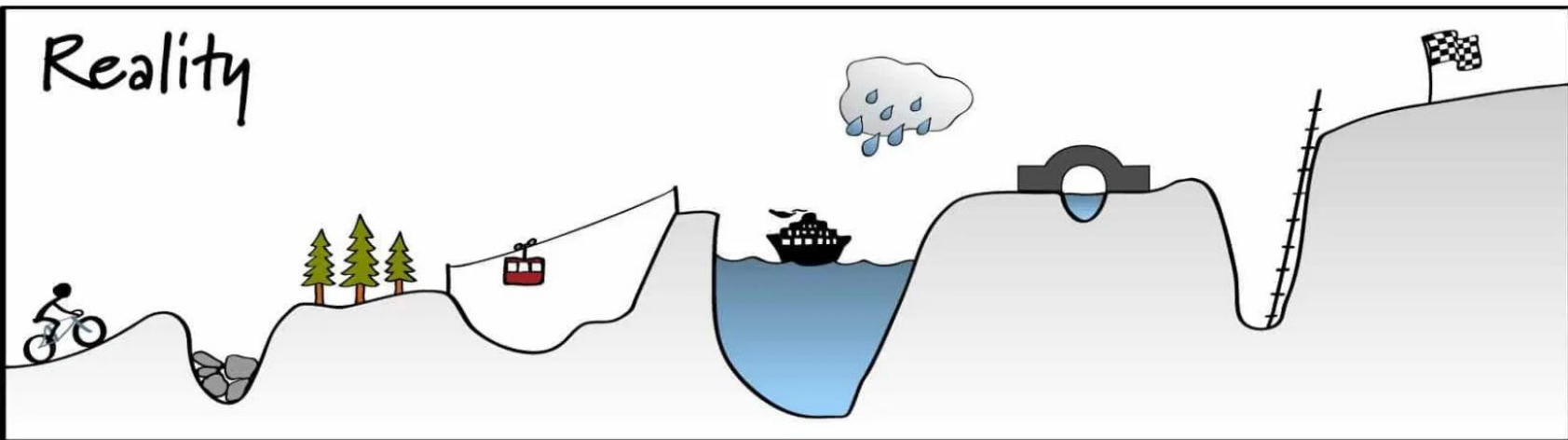
Y mantén una buena actitud!



Your Plan

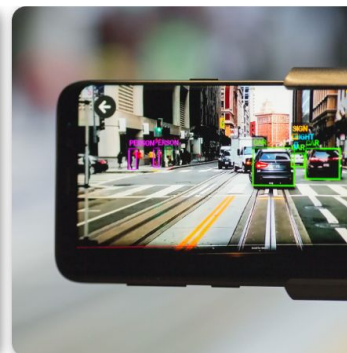
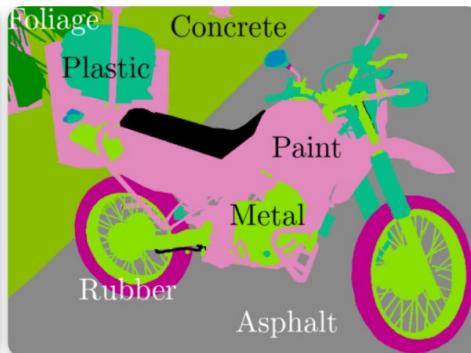
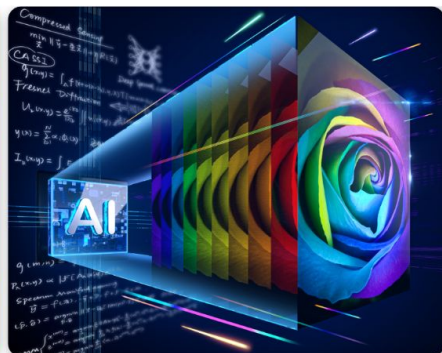


Reality





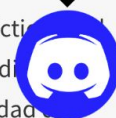
Semillero Hands-on Computer Vision



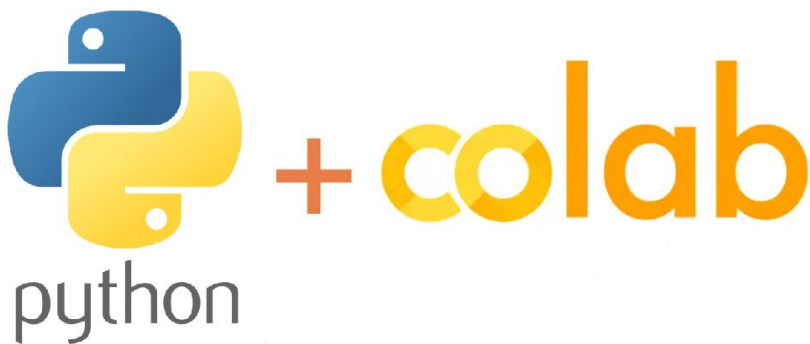
Explora el Futuro de la Visión por Computadora

! Únete al canal de Discord !

Únete a nosotros en el Semillero “Hands-on Computer Vision” y sumérgete en una experiencia única que fusiona la teoría con la práctica en el fascinante mundo de la visión por computadora. Nos enfocaremos en temas avanzados como Fotografía computacional, Aprendizaje profundo, Imágenes térmicas, Imágenes espectrales, Estimación de la profundidad y más. Este semillero te brindará la oportunidad



Herramientas





Let's get started



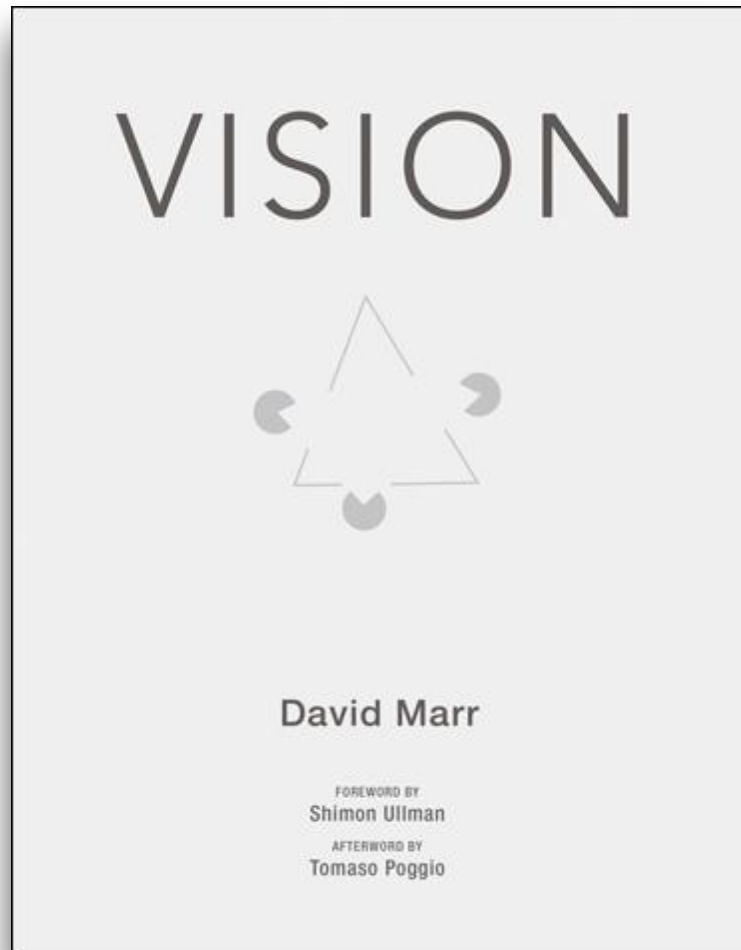


SESIÓN 1: PILOT

¿Qué es Visión?

“¿Qué significa ver? La respuesta del hombre sencillo (y también la de Aristóteles) sería saber qué hay y dónde, **mirando**”

¿Qué significa visión? Descubrir a partir de imágenes **qué** está presente en el mundo, **dónde** están las cosas, qué **acciones** se están produciendo, **predecir** y anticipar acontecimientos



El mundo que nos rodea

$$P(x, y, z, \lambda, t, \theta, \phi, p)$$

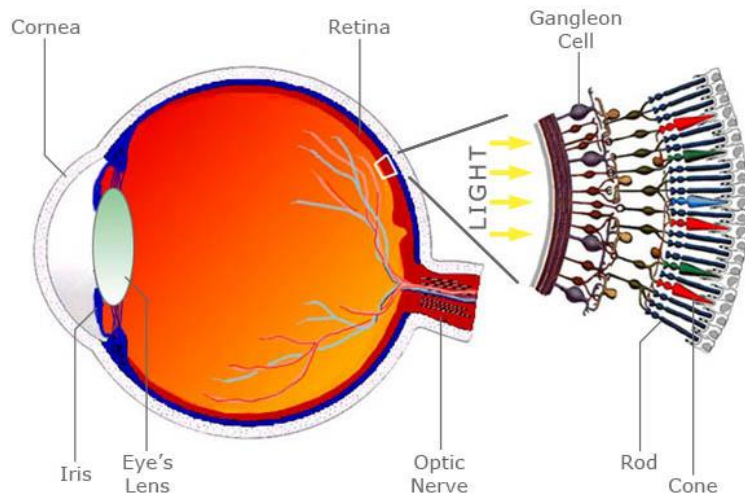
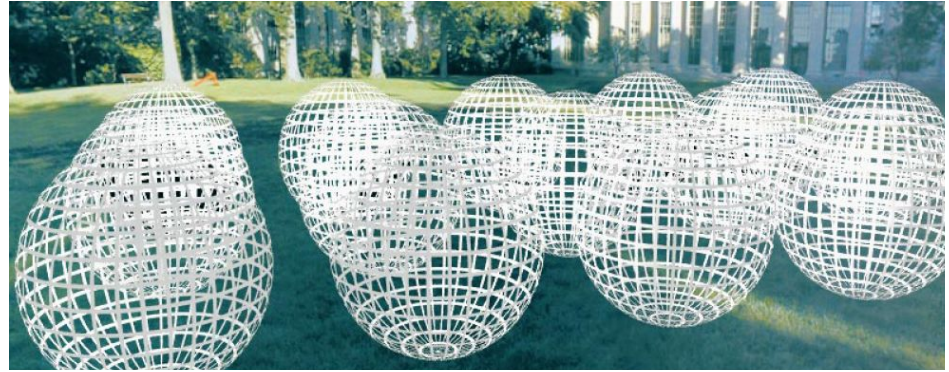
x, y, z : Posición en espacio 3D

λ : Longitud de onda (color)

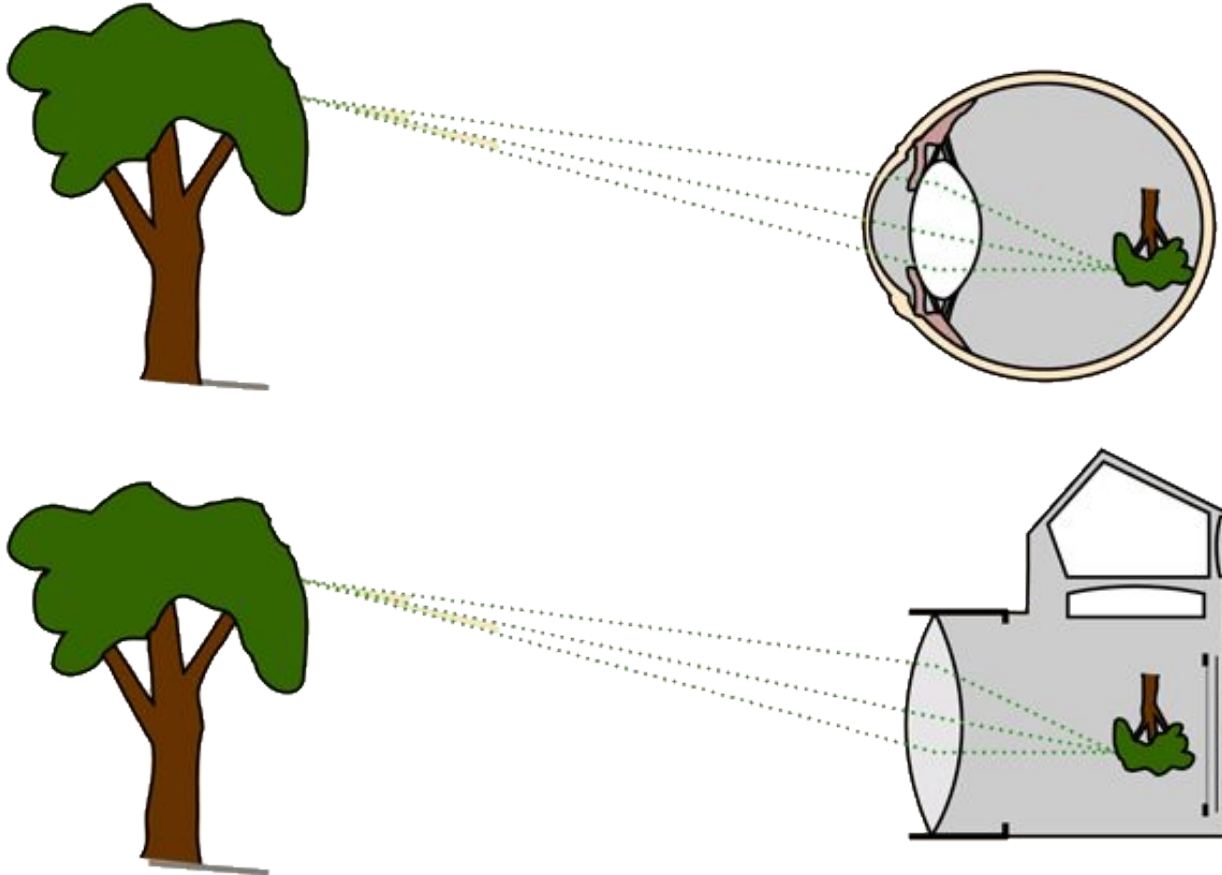
t : Tiempo

θ, ϕ : Angulo (latitud, longitud)

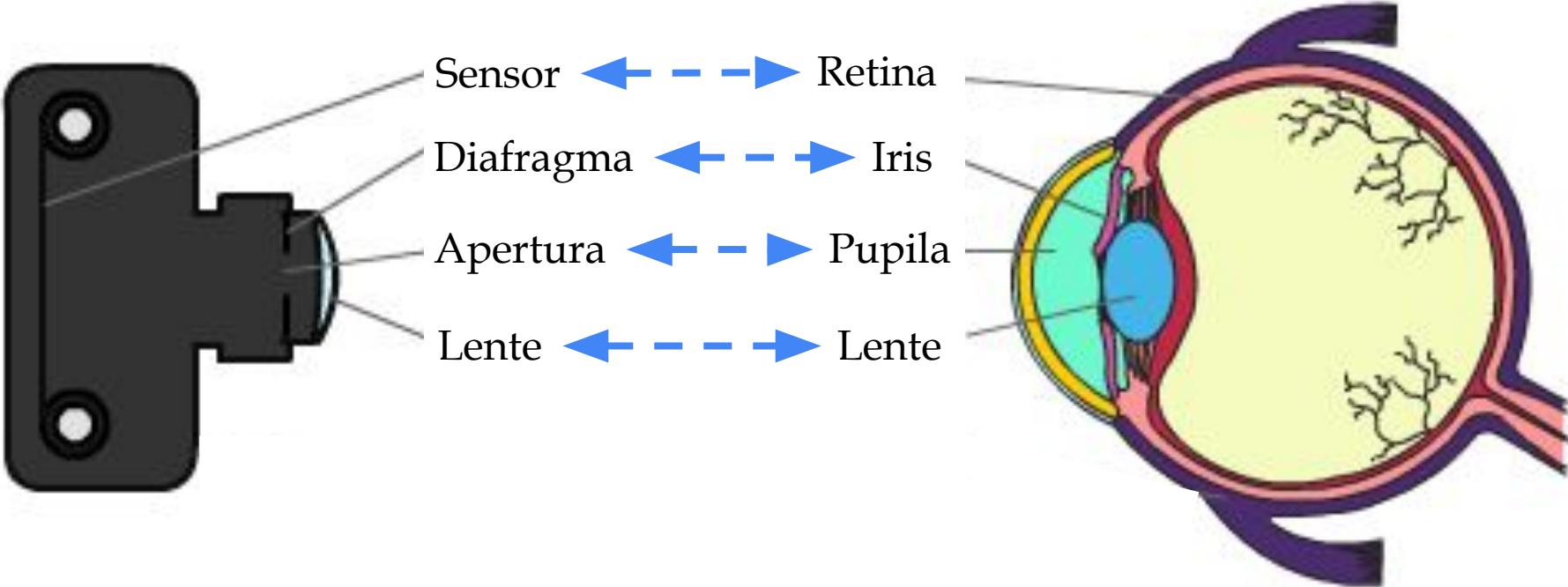
p : Polarización



Una cámara se asimila al ojo humano

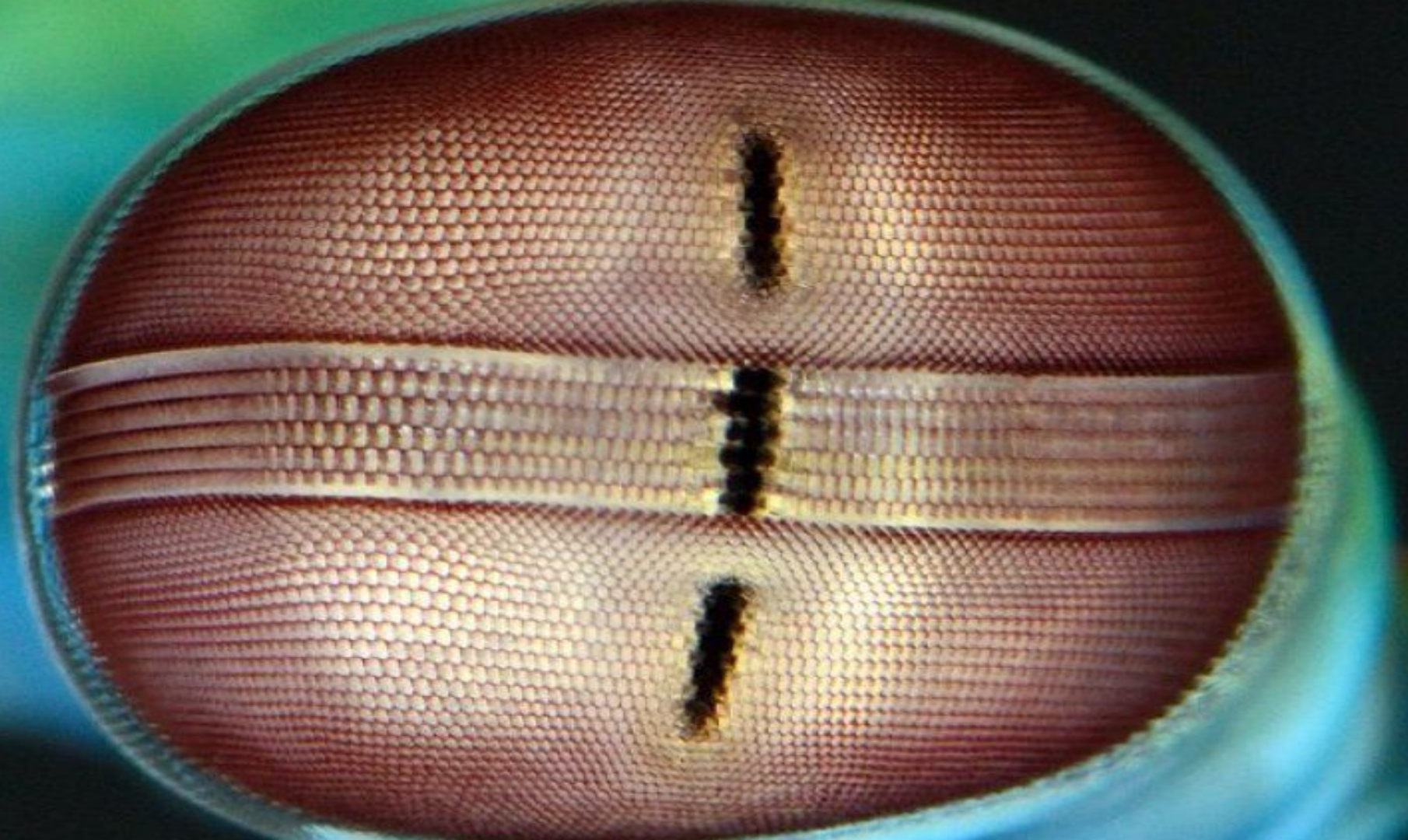


Similitudes

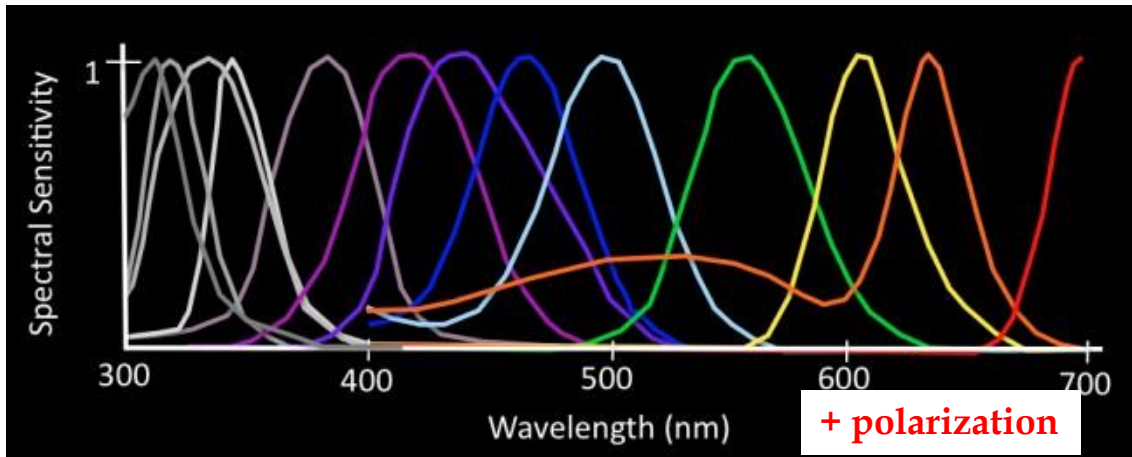
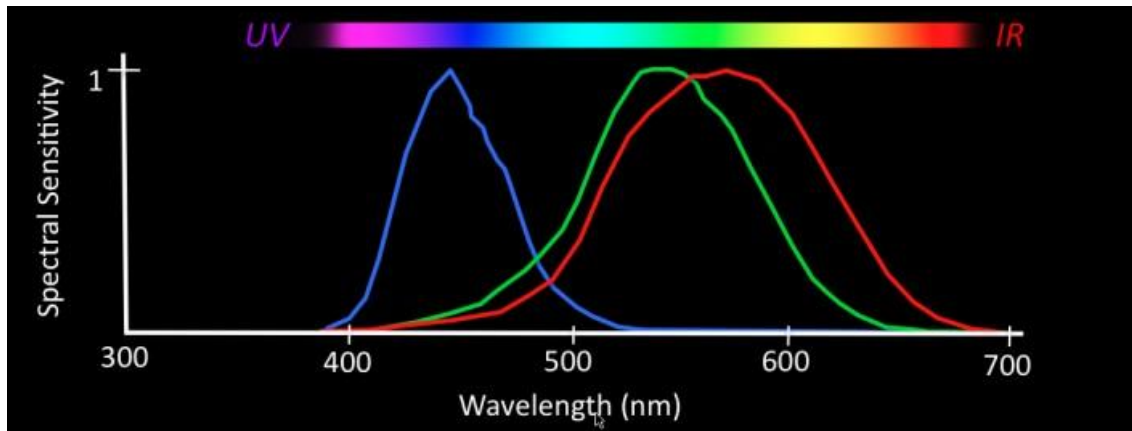
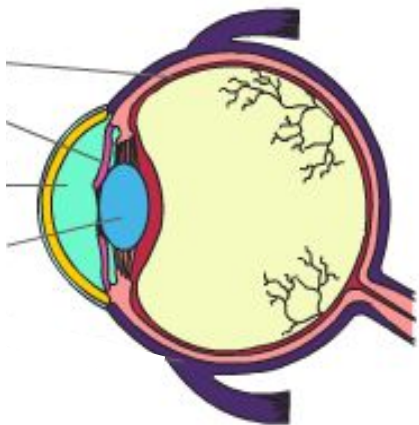






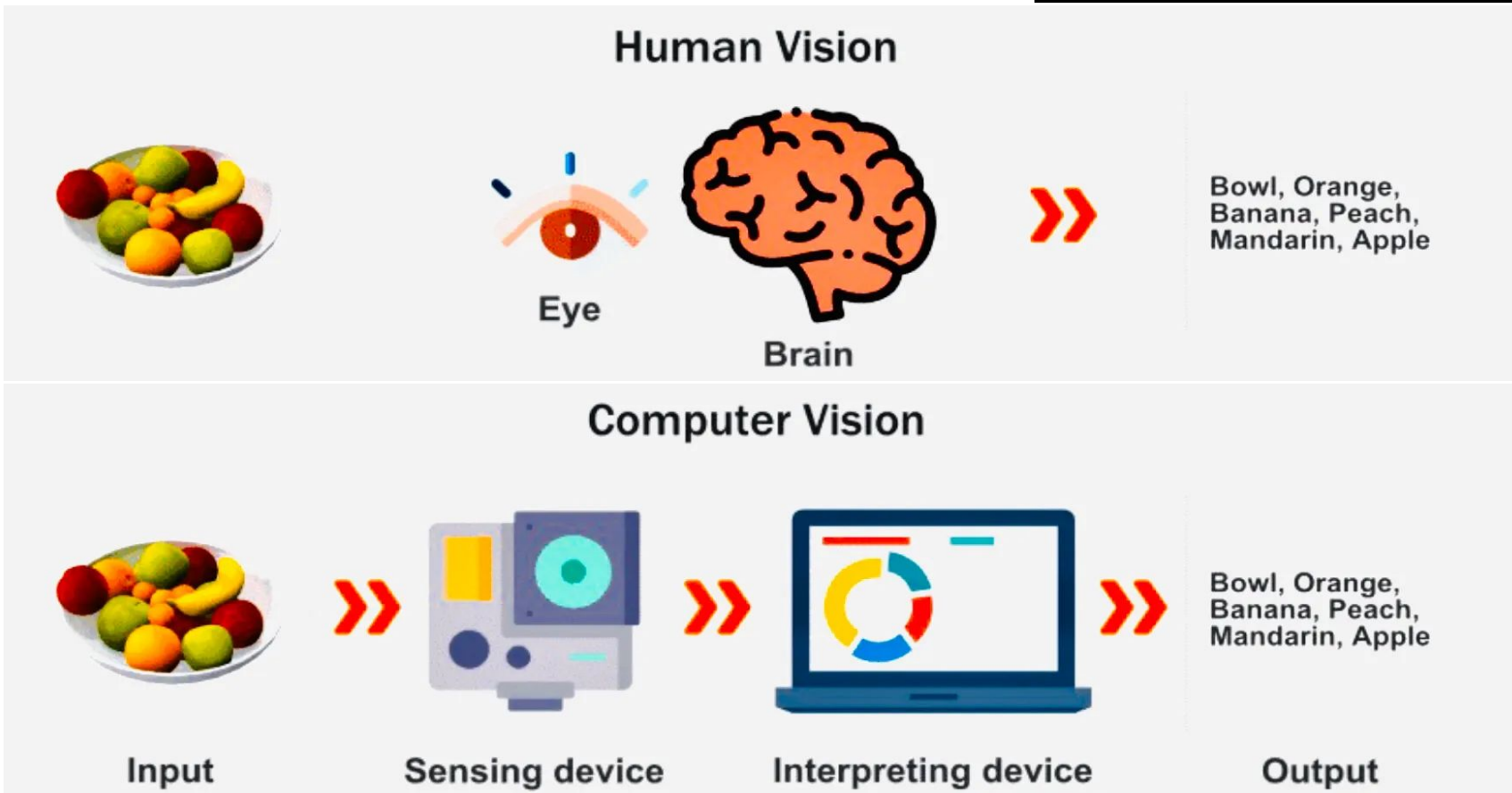


Humano vs. Camarón Mantis



¿Qué es Visión por Computadora?

Ayudando a las computadoras a “ver”



(Dry) Definitions



“... vision is **an inverse problem**, in which we seek to recover some unknown given insufficient information to fully specify the solution. [...] In computer vision we are trying to [...] describe the world in one or more images and **to reconstruct its properties**, such as shape, illumination, and color distributions.”

-- Rick Szeliski



“We observe an image and from this we extract *measurements*. [...] The vision problem or goal is to use the measurements to **infer the world state**. [...] To accomplish the goal we build a *model* [...] a relationship between the measurements and the real world.”

-- Simon J.D Prince

ChatGPT:



You

what is computer vision?



ChatGPT

Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Using digital images from cameras and videos and deep learning models, machines can accurately identify and classify objects, and then react to what they "see."



La CV es un campo de la IA que se ocupa de cómo las computadoras pueden obtener una comprensión de alto nivel a partir de imágenes y videos digitales



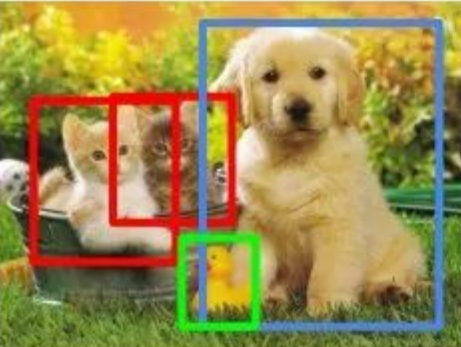
Tareas comunes de la CV

Classification

Classification + Localization

Object Detection

Instance Segmentation



CAT

CAT

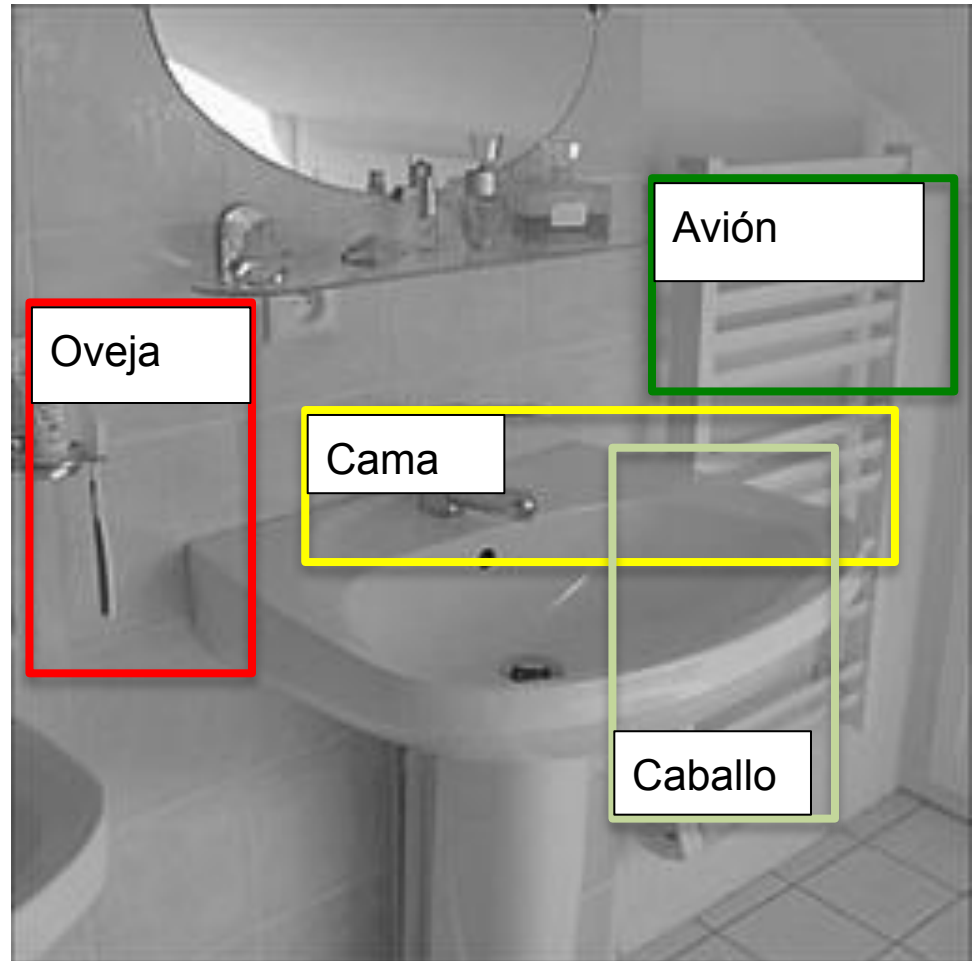
CAT, DOG, DUCK

CAT, DOG, DUCK

Single object

Multiple objects

Primeros pasos de CV



Hoy



traffic light



traffic light



traffic light
traffic light
traffic light

traffic traffic light



bus

truck

car

car

car

truck

truck

person

person person person person

car

person

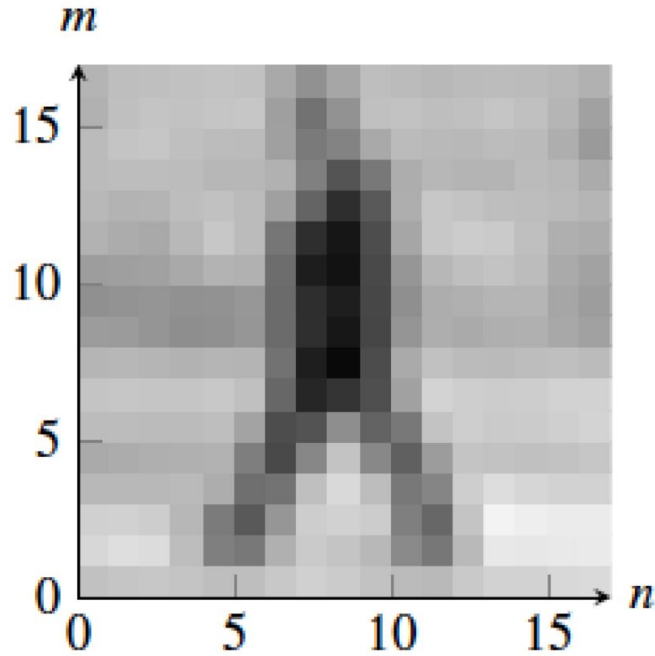
car

person person

handbag

¿Por qué es difícil “ver”?

Lo que nosotros “vemos”



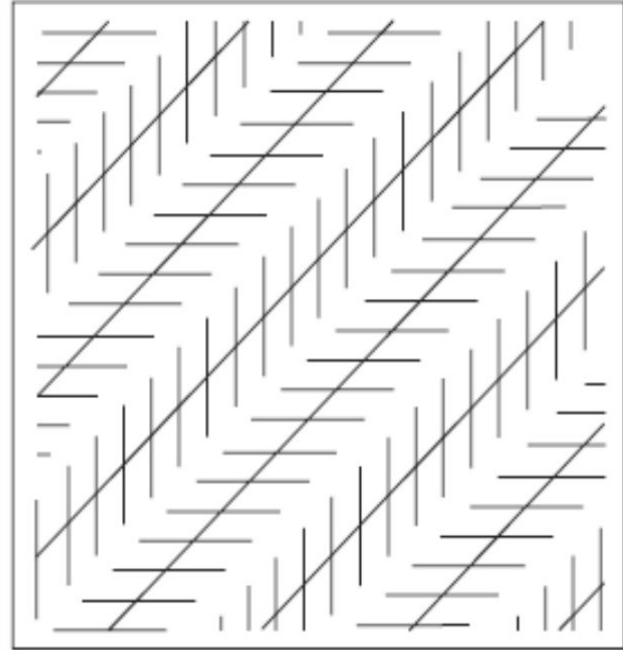
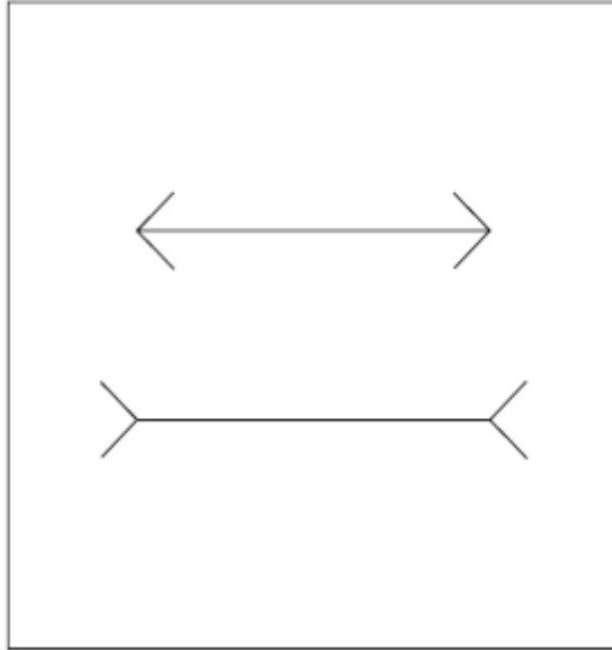
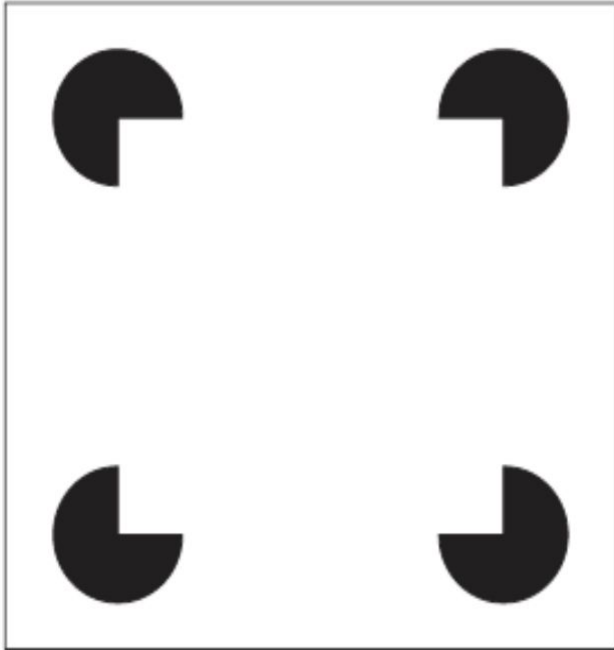
Lo que obtiene la máquina

I =

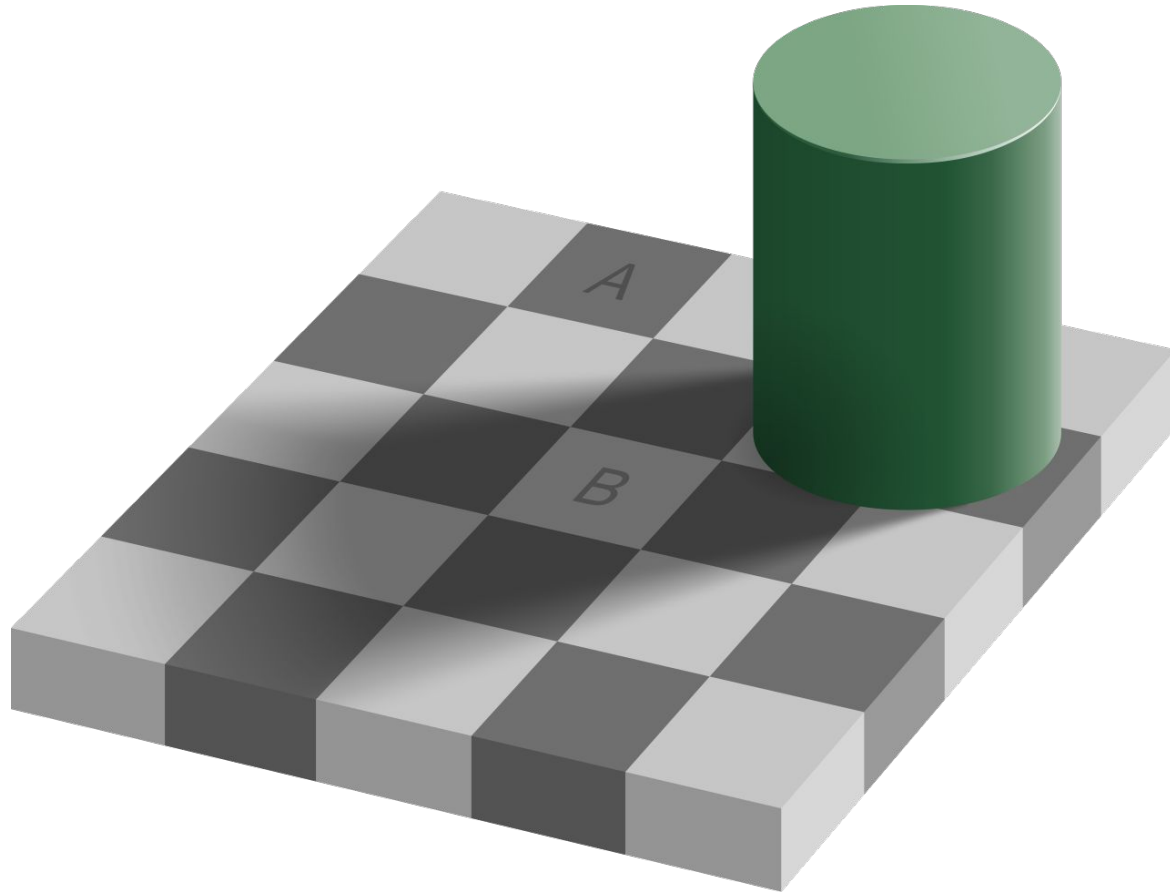
| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 160 | 175 | 171 | 168 | 168 | 172 | 164 | 158 | 167 | 173 | 167 | 163 | 162 | 164 | 160 | 159 | 163 | 162 |
| 149 | 164 | 172 | 175 | 178 | 179 | 176 | 118 | 97 | 168 | 175 | 171 | 169 | 175 | 176 | 177 | 165 | 152 |
| 161 | 166 | 182 | 171 | 170 | 177 | 175 | 116 | 109 | 169 | 177 | 173 | 168 | 175 | 175 | 159 | 153 | 123 |
| 171 | 174 | 177 | 175 | 167 | 161 | 157 | 138 | 103 | 112 | 157 | 164 | 159 | 160 | 165 | 169 | 148 | 144 |
| 163 | 163 | 162 | 165 | 167 | 164 | 178 | 167 | 77 | 55 | 134 | 170 | 167 | 162 | 164 | 175 | 168 | 160 |
| 173 | 164 | 158 | 165 | 180 | 180 | 150 | 89 | 61 | 34 | 137 | 186 | 186 | 182 | 175 | 165 | 160 | 164 |
| 152 | 155 | 146 | 147 | 169 | 180 | 163 | 51 | 24 | 32 | 119 | 163 | 175 | 182 | 181 | 162 | 148 | 153 |
| 134 | 135 | 147 | 149 | 150 | 147 | 148 | 62 | 36 | 46 | 114 | 157 | 163 | 167 | 169 | 163 | 146 | 147 |
| 135 | 132 | 131 | 125 | 115 | 129 | 132 | 74 | 54 | 41 | 104 | 156 | 152 | 156 | 164 | 156 | 141 | 144 |
| 151 | 155 | 151 | 145 | 144 | 149 | 143 | 71 | 31 | 29 | 129 | 164 | 157 | 155 | 159 | 158 | 156 | 148 |
| 172 | 174 | 178 | 177 | 177 | 181 | 174 | 54 | 21 | 29 | 136 | 190 | 180 | 179 | 176 | 184 | 187 | 182 |
| 177 | 178 | 176 | 173 | 174 | 180 | 150 | 27 | 101 | 94 | 74 | 189 | 188 | 186 | 183 | 186 | 188 | 187 |
| 160 | 160 | 163 | 163 | 161 | 167 | 100 | 45 | 169 | 166 | 59 | 136 | 184 | 176 | 175 | 177 | 185 | 186 |
| 147 | 150 | 153 | 155 | 160 | 155 | 56 | 111 | 182 | 180 | 104 | 84 | 168 | 172 | 171 | 164 | 168 | 167 |
| 184 | 182 | 178 | 175 | 179 | 133 | 86 | 191 | 201 | 204 | 191 | 79 | 172 | 220 | 217 | 205 | 209 | 200 |
| 184 | 187 | 192 | 182 | 124 | 32 | 109 | 168 | 171 | 167 | 163 | 51 | 105 | 203 | 209 | 203 | 210 | 205 |
| 191 | 198 | 203 | 197 | 175 | 149 | 169 | 189 | 190 | 173 | 160 | 145 | 156 | 202 | 199 | 201 | 205 | 202 |
| 153 | 149 | 153 | 155 | 173 | 182 | 179 | 177 | 182 | 177 | 182 | 185 | 179 | 177 | 167 | 176 | 182 | 180 |

La cámara es un dispositivo de medición, no un sistema de visión.

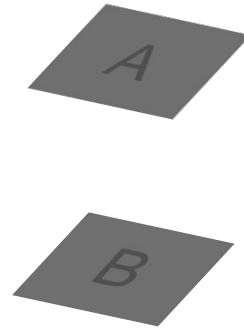
Ver: Percepción Humana vs. Medición Real



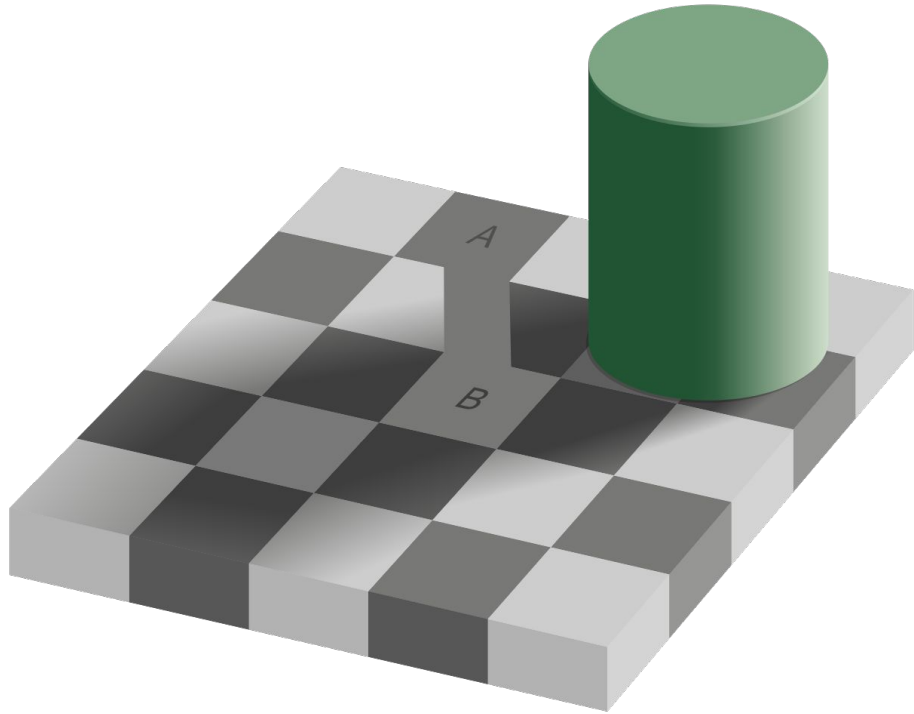
Ver: Percepción Humana vs. Medición Real



Ver: Percepción Humana vs. Medición Real



Ver: Percepción Humana vs. Medición Real





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Exit one
Northbound platform 9





¿Qué crees que es?

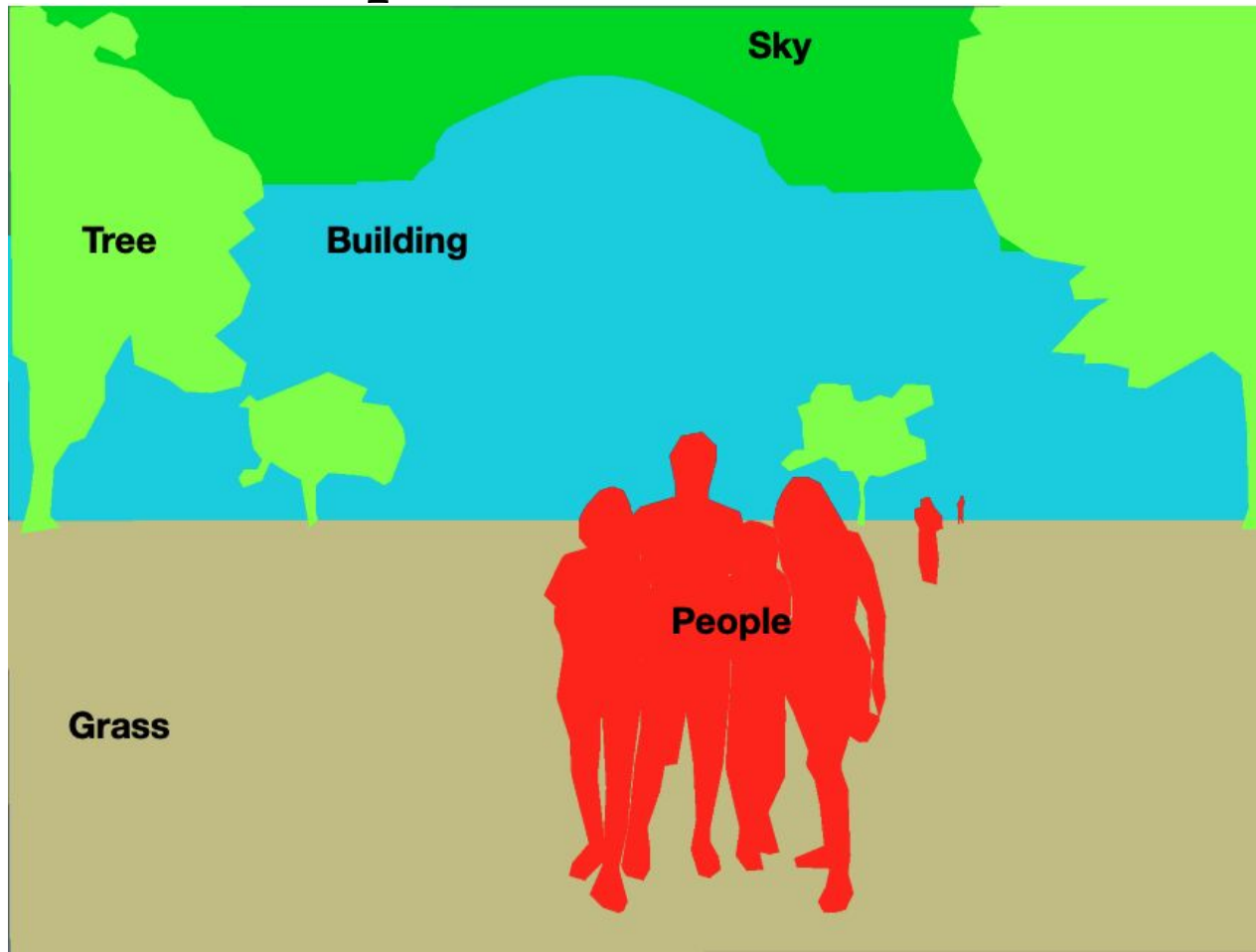




Qué “le importa” a los humanos?



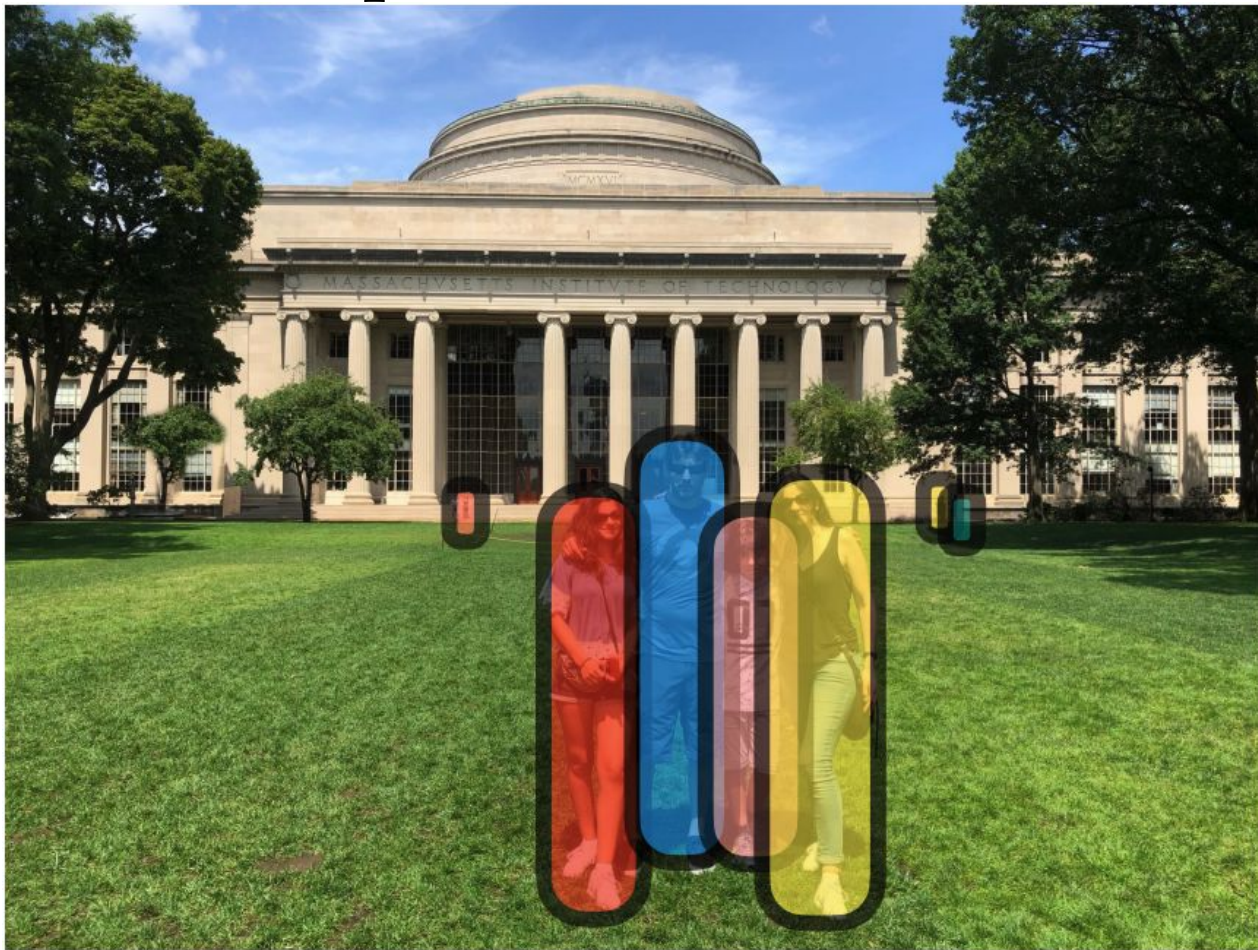
Qué “le importa” a los humanos?



Segmentación semántica:

Asignar etiquetas a todos los píxeles de la imagen.

Qué “le importa” a los humanos?



Detección:
Localizar a todas
las personas en
esta imagen

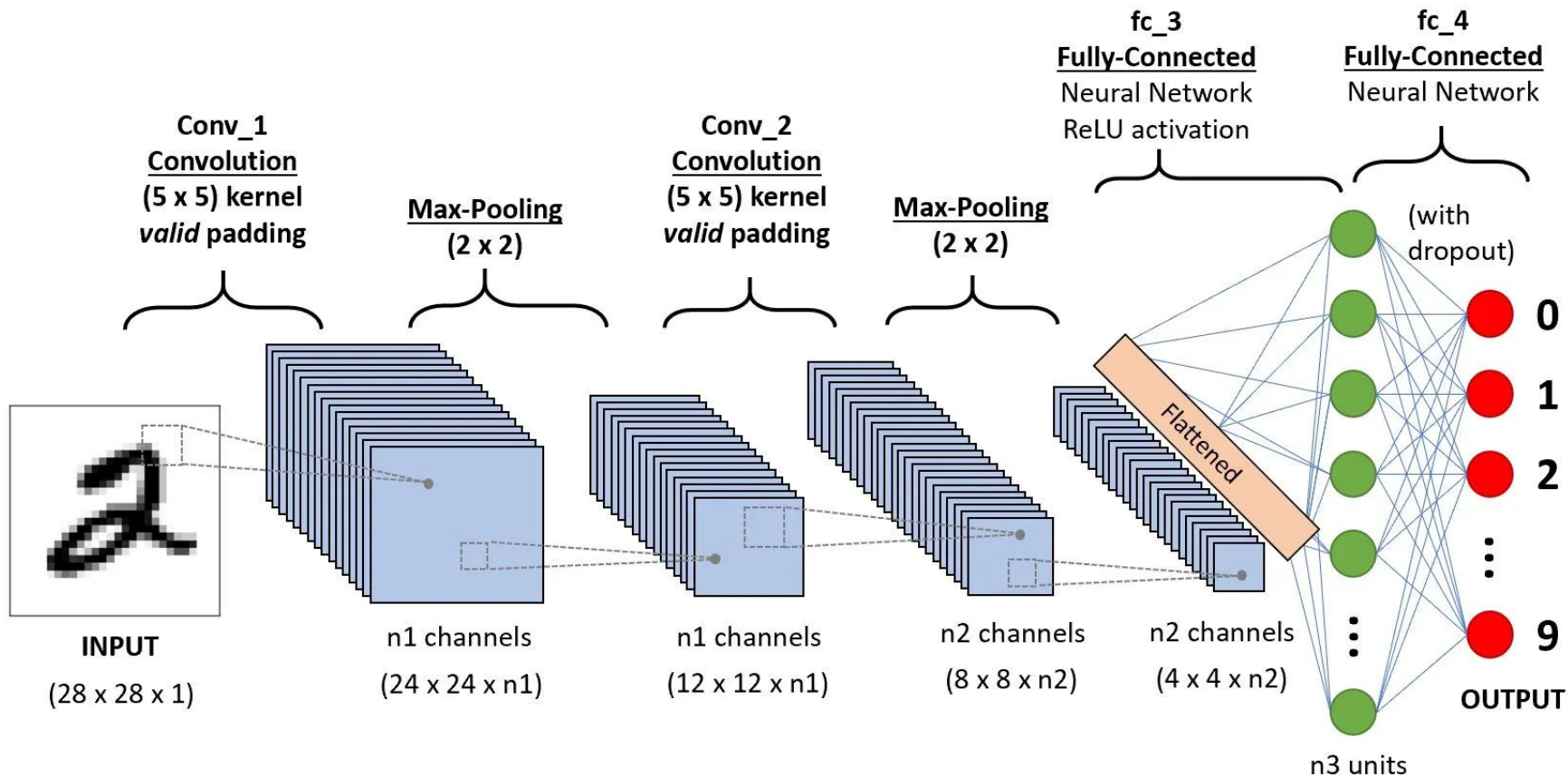
Qué “le importa” a los humanos?



Recognition: who is this person?



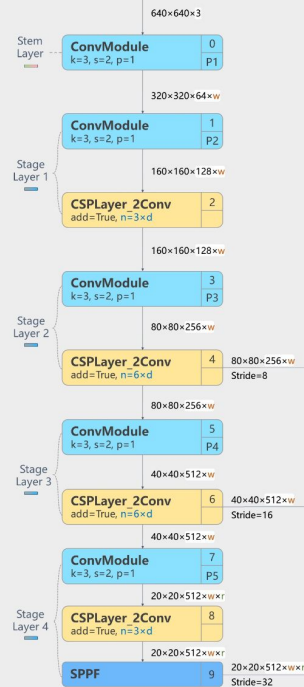
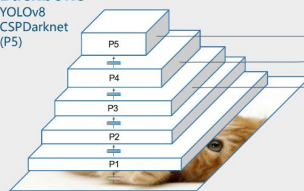
Deep Learning "AI Rescate"



You Only Look Once

Backbone

YOLOv8 CSPDarknet (P5)



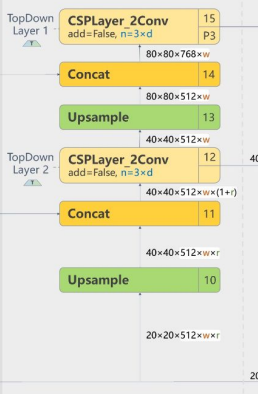
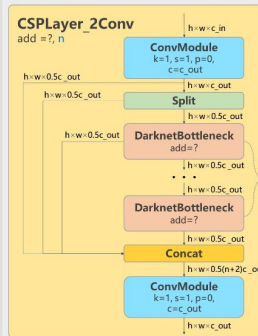
Backbone

Neck

YOLOv8PAFPN



Details

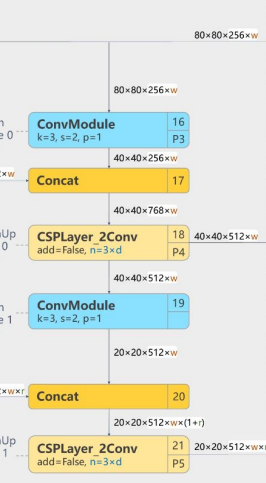
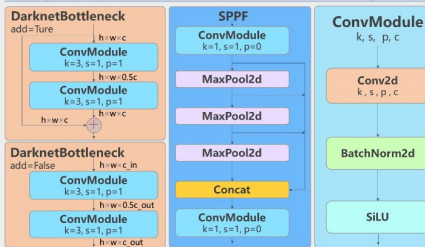


Head

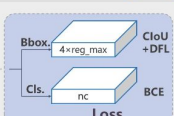
YOLOv8HeadModule



| model | d (deepen_factor) | w (widen_factor) | r (ratio) |
|-------|-------------------|------------------|-----------|
| n | 0.33 | 0.25 | 2.0 |
| s | 0.33 | 0.50 | 2.0 |
| m | 0.67 | 0.75 | 1.5 |
| l | 1.00 | 1.00 | 1.0 |
| x | 1.00 | 1.25 | 1.0 |



Neck



Note:
 1. The numbers on the connecting line stand for height*width*channel
 2. CSPLayer_2Conv stands for CSPLayerWithTwoConv in MMYOLO repo.
 3. Since the number of output channels in the last stage of different sizes of models is different, (ratio) is used in this figure for convenience. In MMYOLO repo, 'last_stage_out_channels' is used to control the number.

Head

YOLO



traffic light



traffic light



traffic light
traffic light
traffic light

traffic traffic light



bus

truck

car

car

car

truck

truck

person

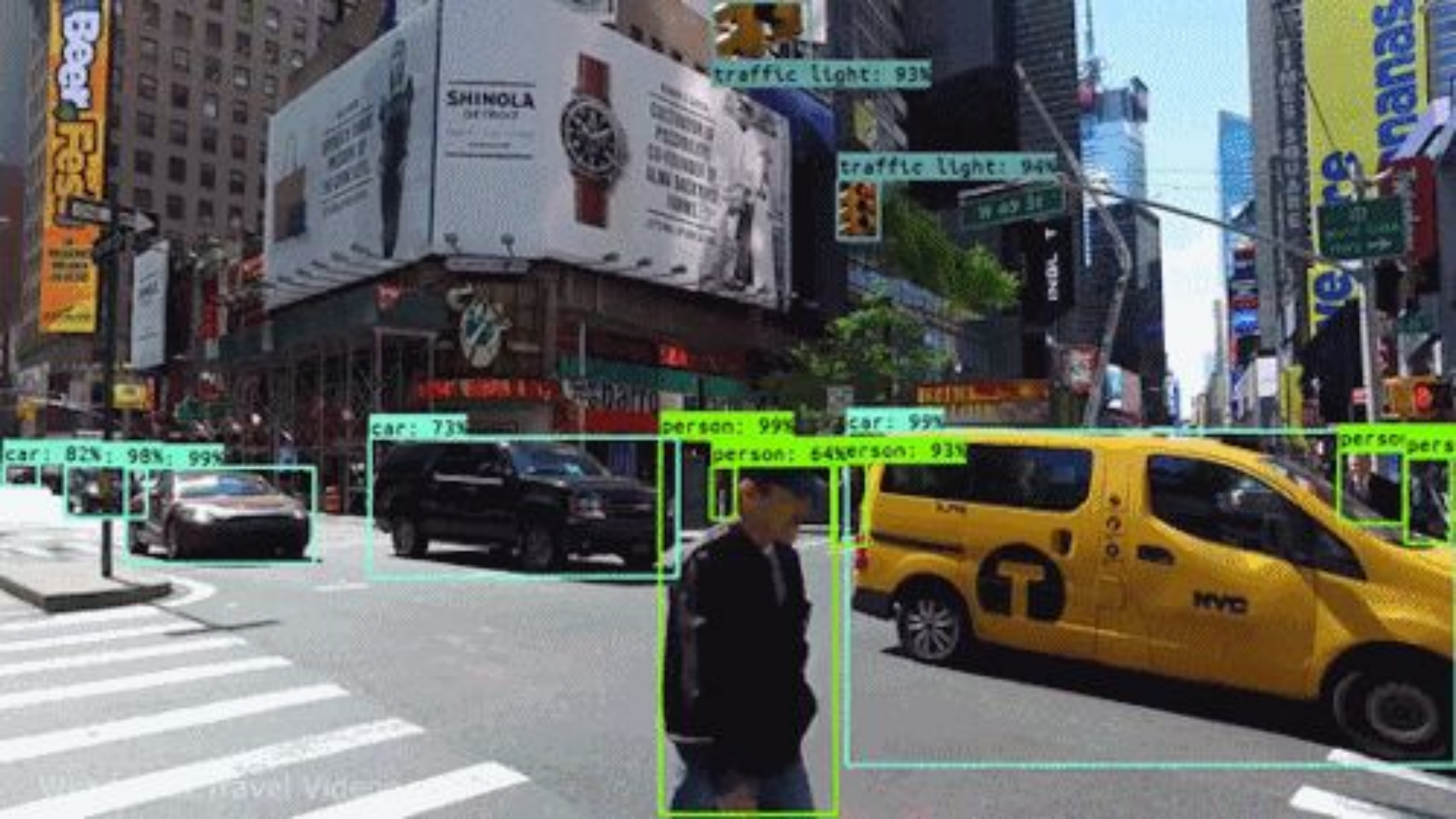
person person person person

handbag

person

car

person person



traffic light: 93%

traffic light: 94%

W 43 St

car: 73%

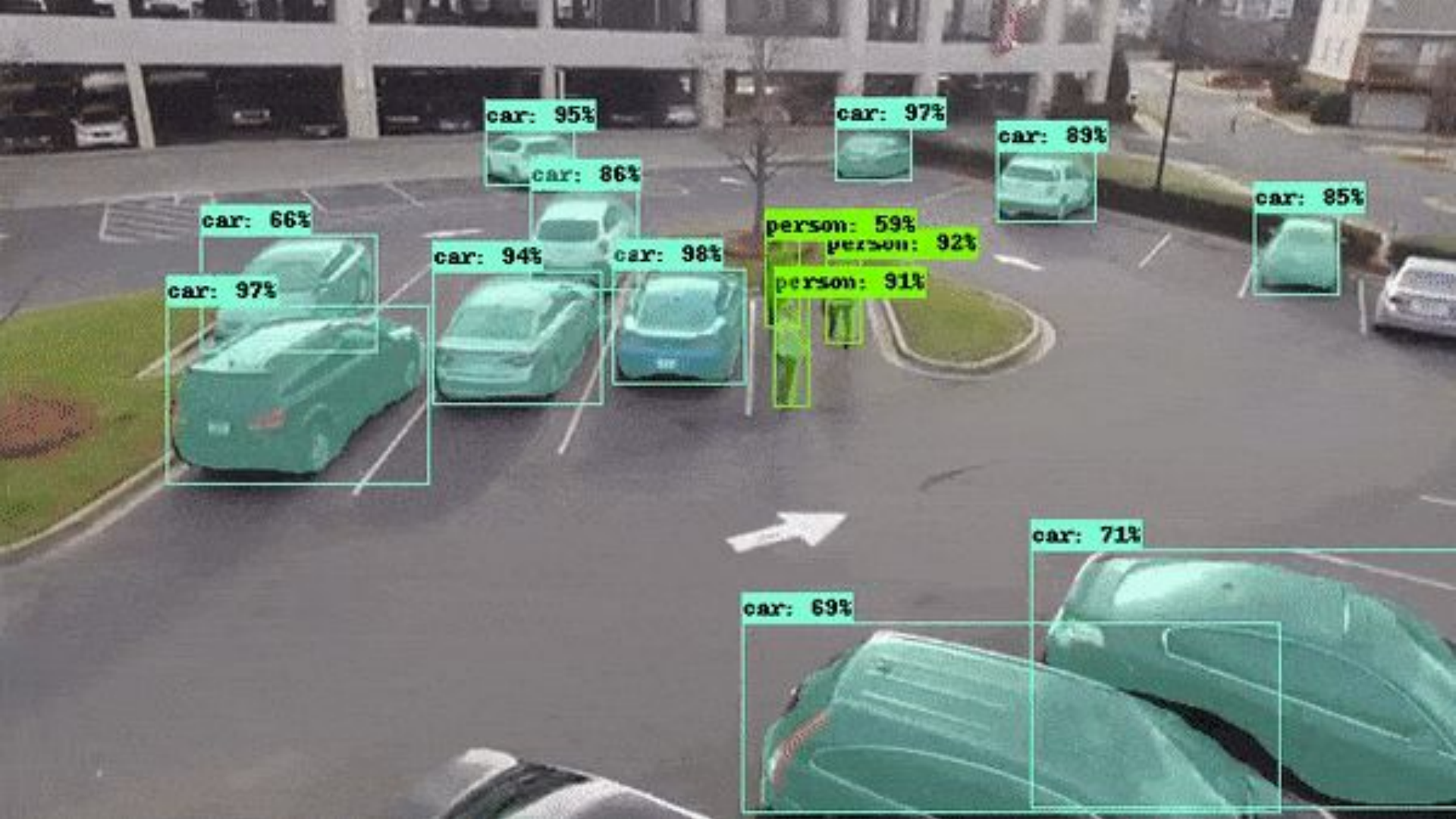
person: 99%

car: 99%

car: 82% 98% 99%

person: 64% person: 93%

person



car: 95%

car: 97%

car: 89%

car: 85%

car: 66%

car: 86%

person: 59%

person: 92%

person: 91%

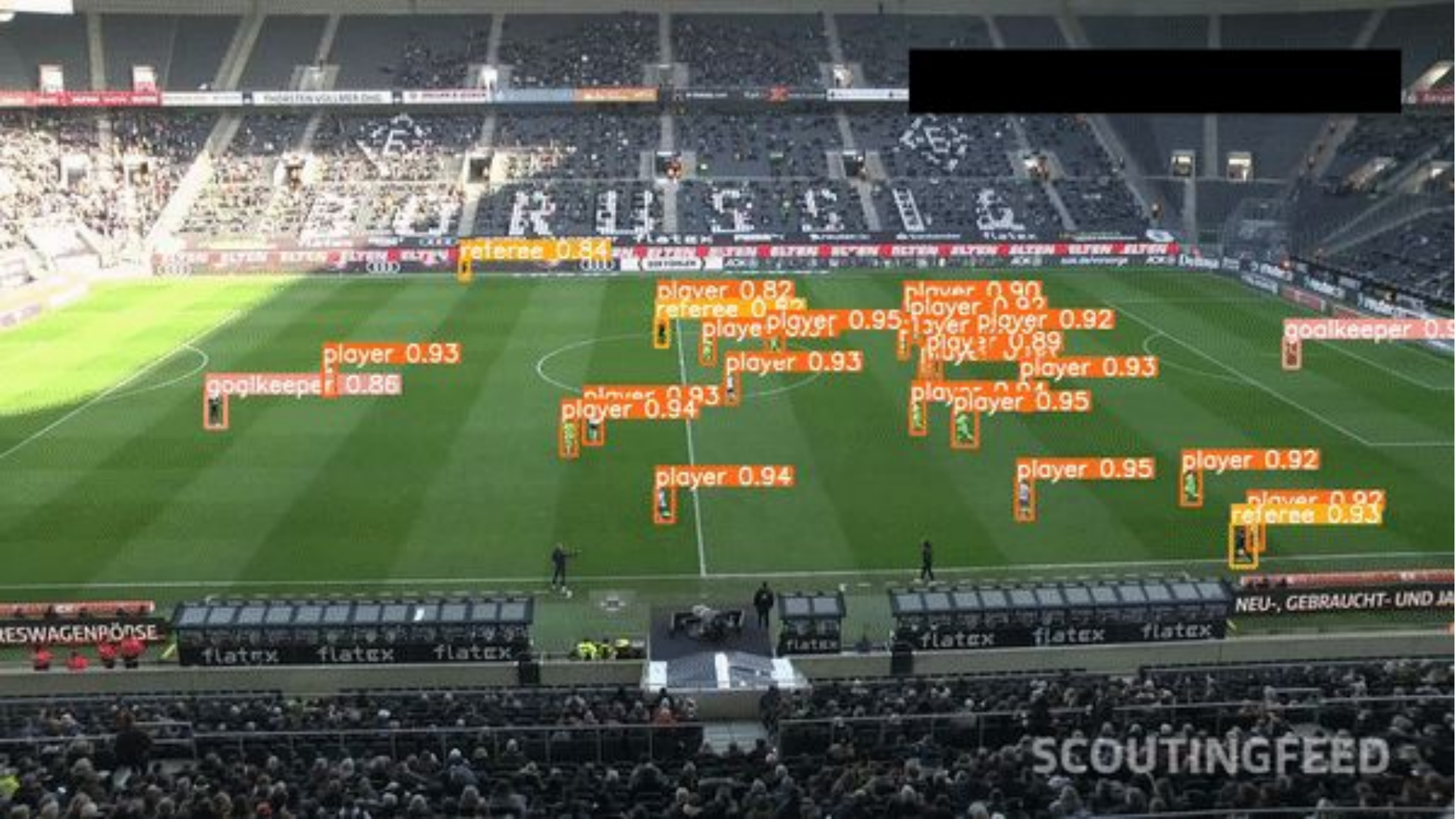
car: 94%

car: 98%

car: 97%

car: 71%

car: 69%



referee 0.84

player 0.93

goalkeeper 0.86

player 0.82

referee 0.82

player 0.95

player 0.93

player 0.93

player 0.94

player 0.94

player 0.90

player 0.87

player 0.92

player 0.89

player 0.91

player 0.95

player 0.95

player 0.92

player 0.92

referee 0.93

goalkeeper 0.86

RESWAGENPÖSE

flatex flatex flatex

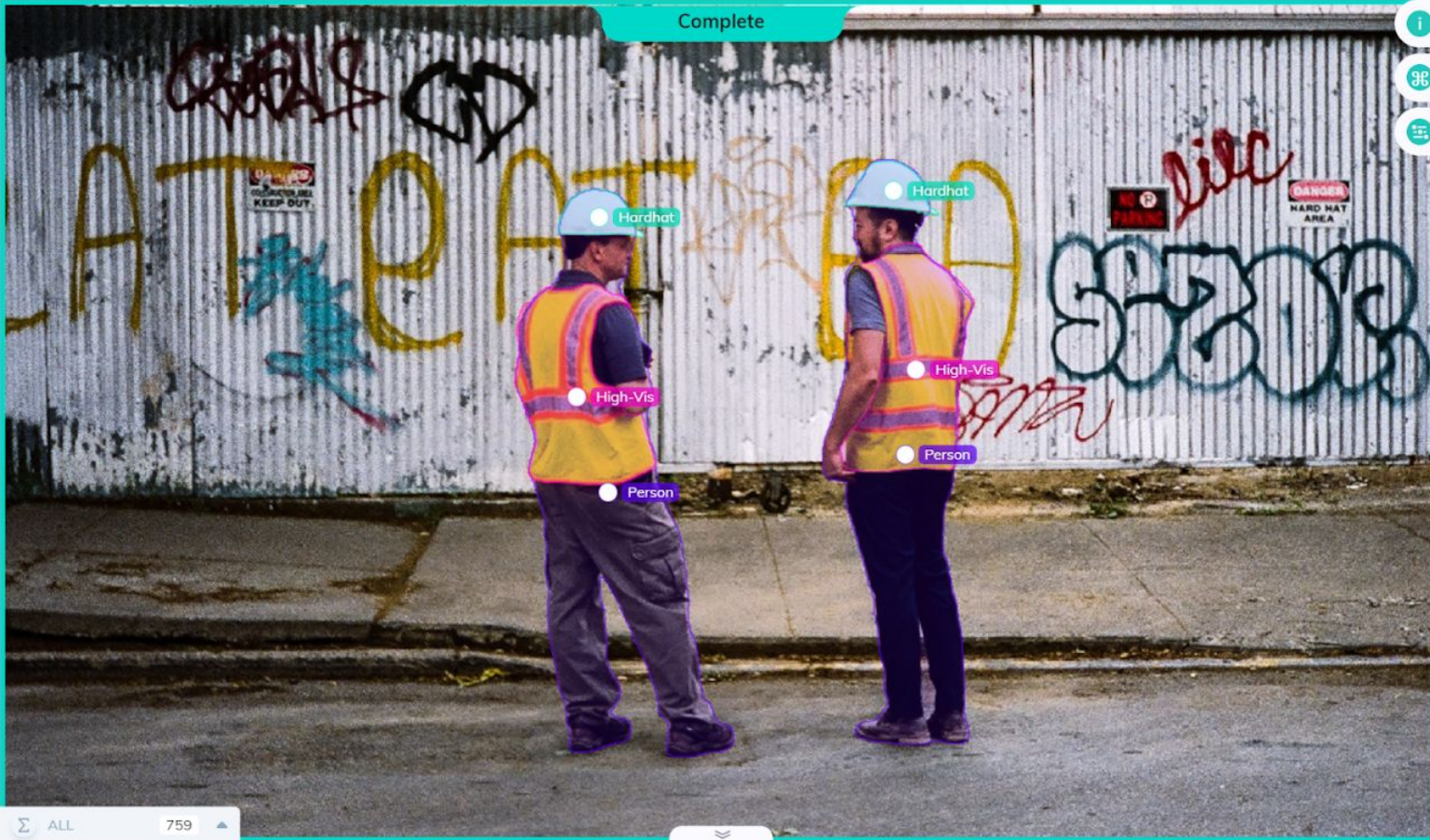
flatex

flatex flatex flatex

NEU-, GEBRAUCHT- UND JA

SCOUTINGFEED

Complete



ANNOTATIONS

- High-Vis
- High-Vis
- Hardhat
- Hardhat
- Person
- Person

TAGS

Type in a tag

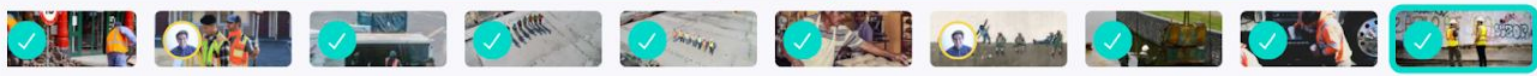
Select a tag or create one ↓

tag



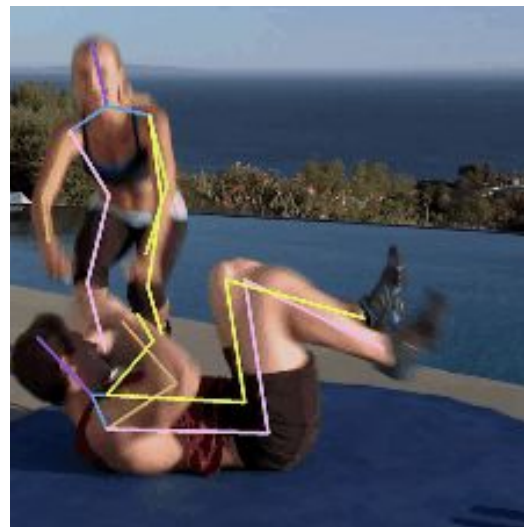
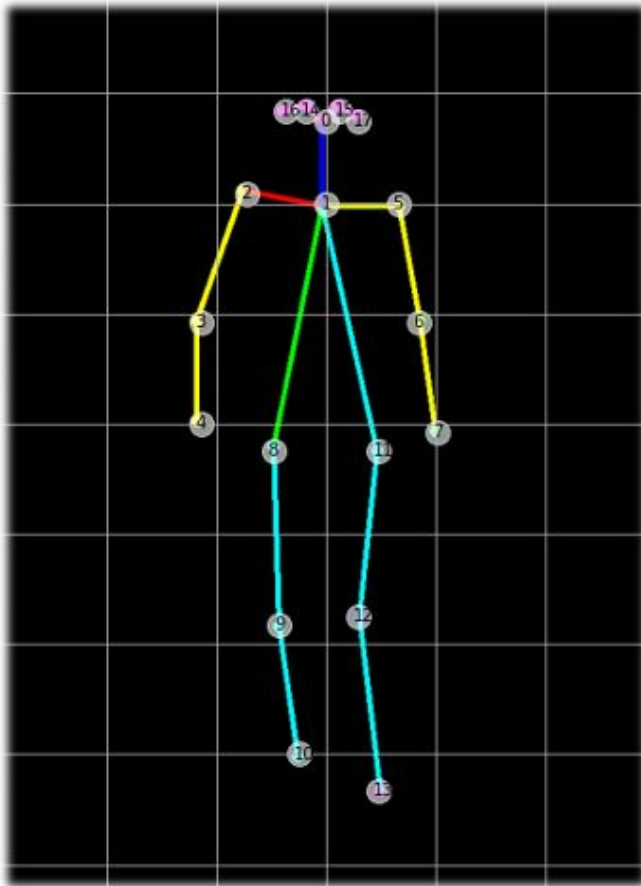
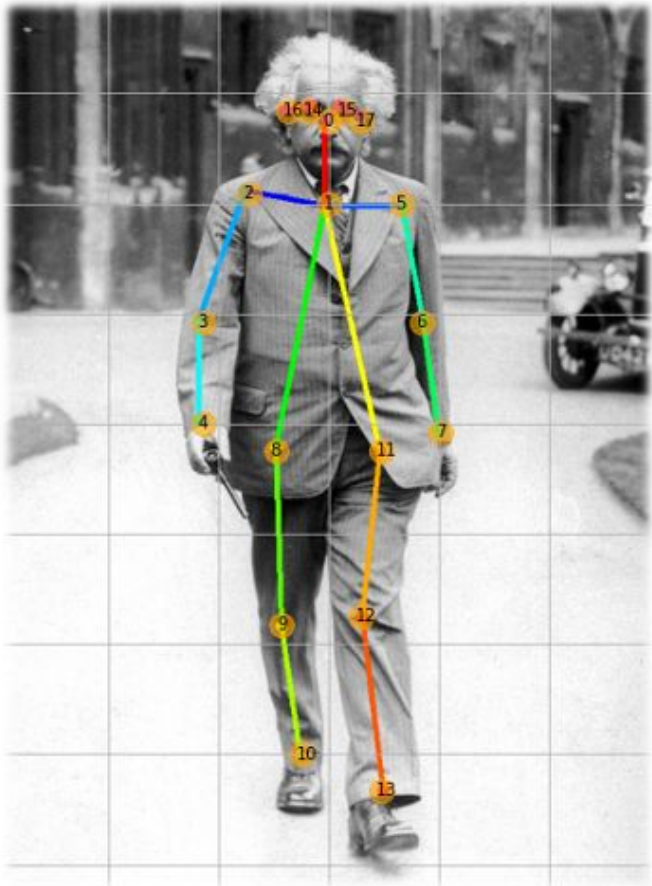
62%

Σ ALL 759



Create Tag

Estimación de Pose





person id : 3
age : 30 - 35
gender : male
dwell time : 2.8 sec

emotions

angry ●
disgusted ●
fearful ●
happy ██████████
sad ●
surprised ●
natural ██████

person id : 2
age : 30 - 35
gender : male
dwell time : 3.2 sec

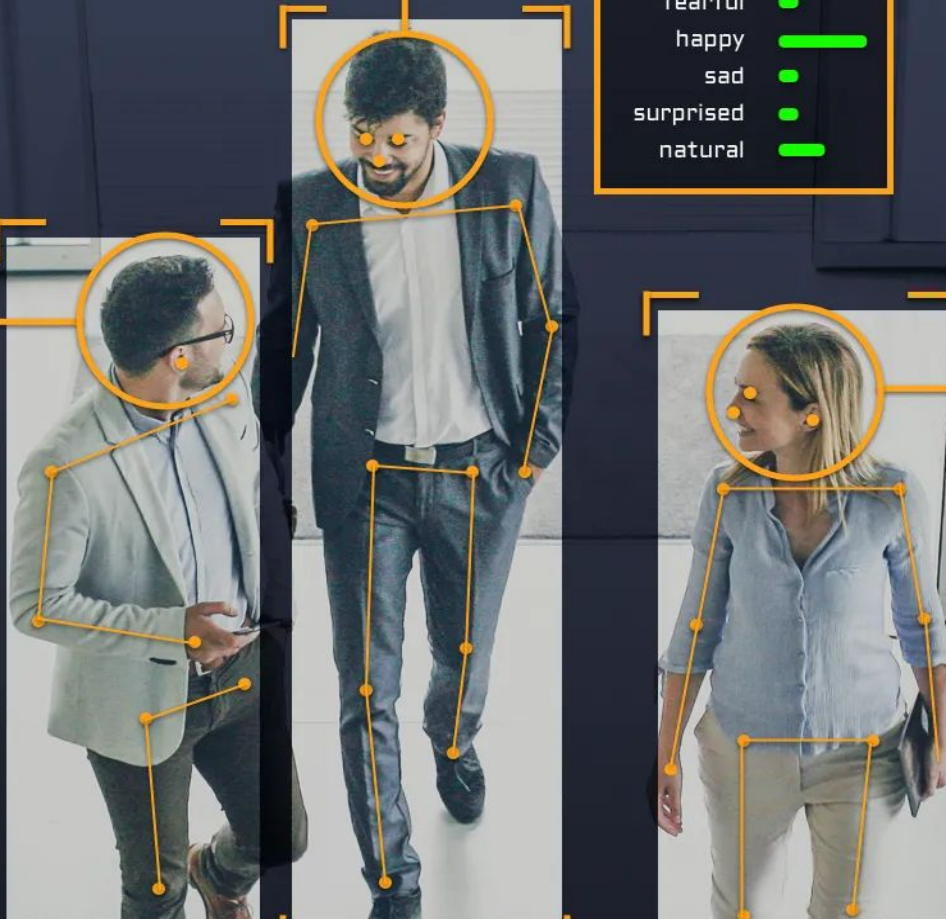
emotions

angry ●
disgusted ●
fearful ●
happy ██████████
sad ●
surprised ●
natural ██████

person id : 1
age : 30 - 35
gender : female
dwell time : 3.7 sec

emotions

angry ●
disgusted ●
fearful ●
happy ██████████
sad ●
surprised ●
natural ██████



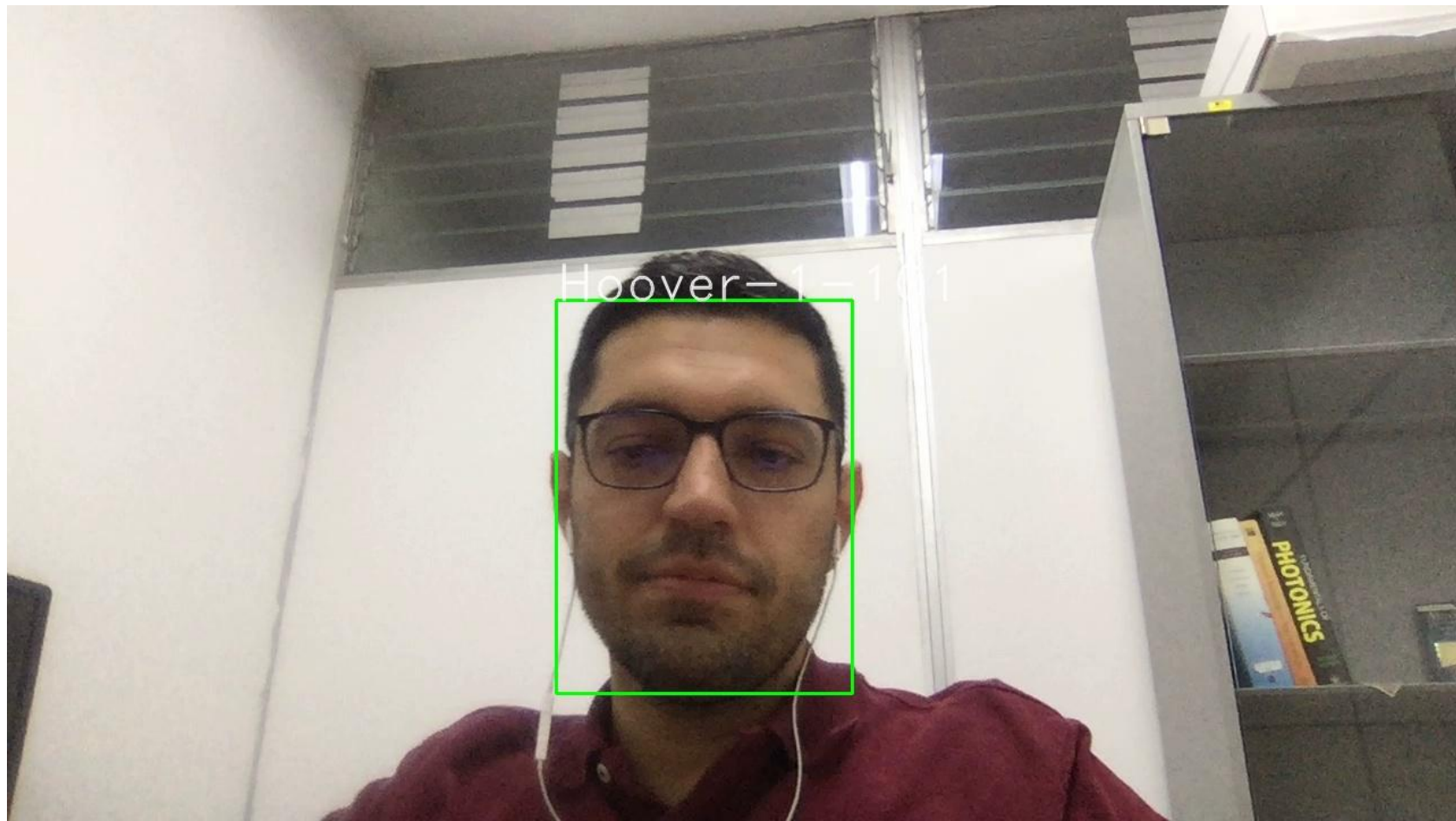
Count: 443

Deregistration Zone

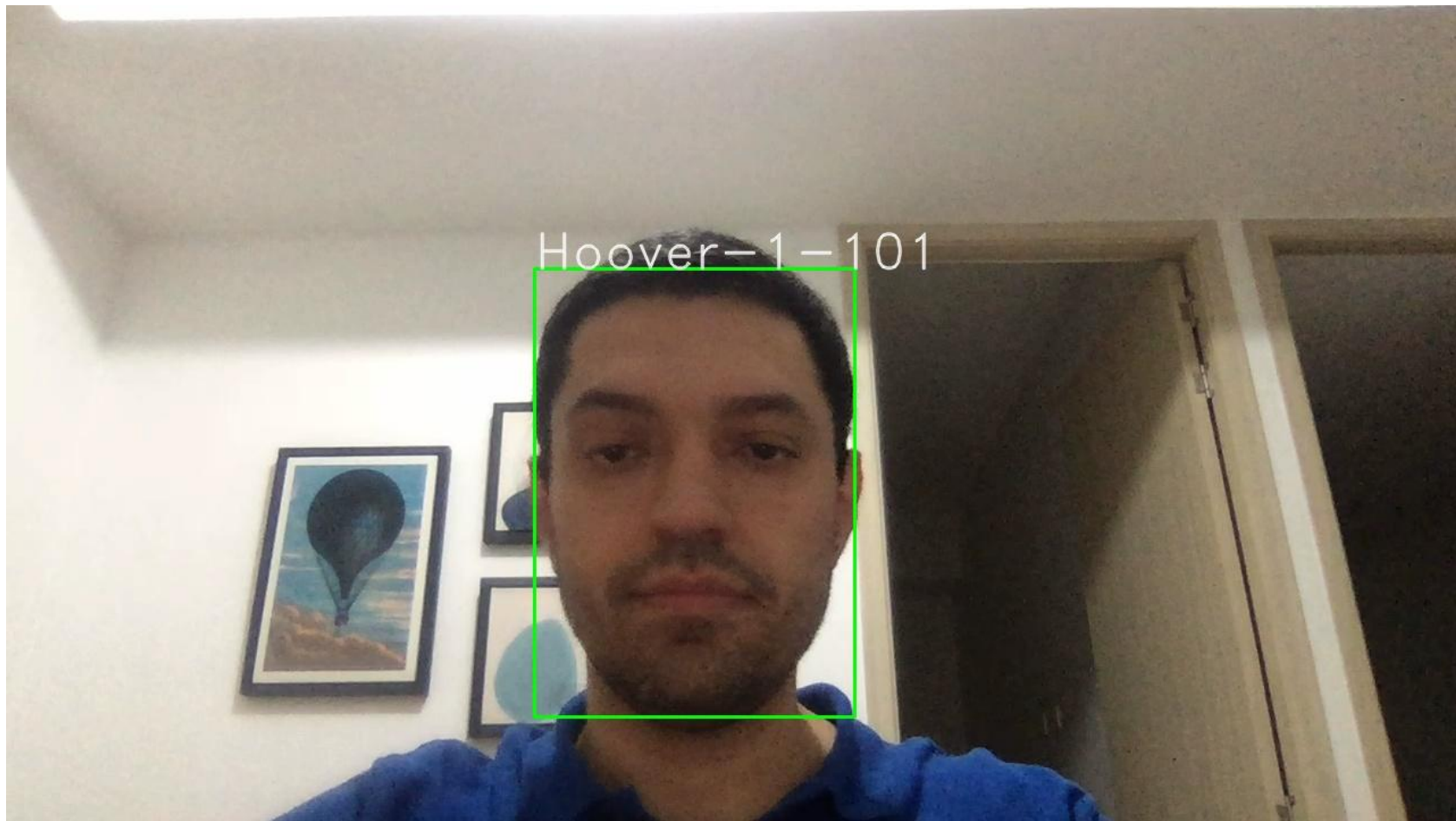
Count Line

Registration Zone

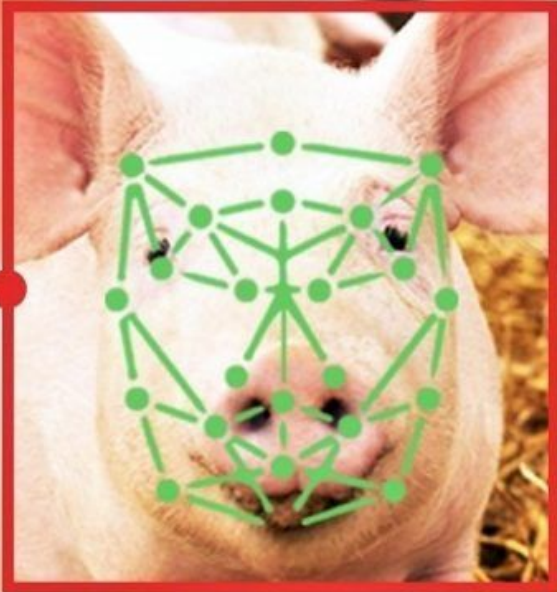
Reconocimiento facial



Reconocimiento facial



Reconocimiento del estado de ánimo (Happy pig!)



PIG

Detección de placas

Frame count: 0 Total FPS: 4
Detection FPS: 18
Recognition FPS: 1



CV is still an open problem





Chihuahua or Muffin Challenge - Please tell me what is displayed in each cell (Dog or Muffin).
Use a tabular format aligned with the picture grid (8x4).



Sure! Here's the content of each cell in the 8x4 grid format:



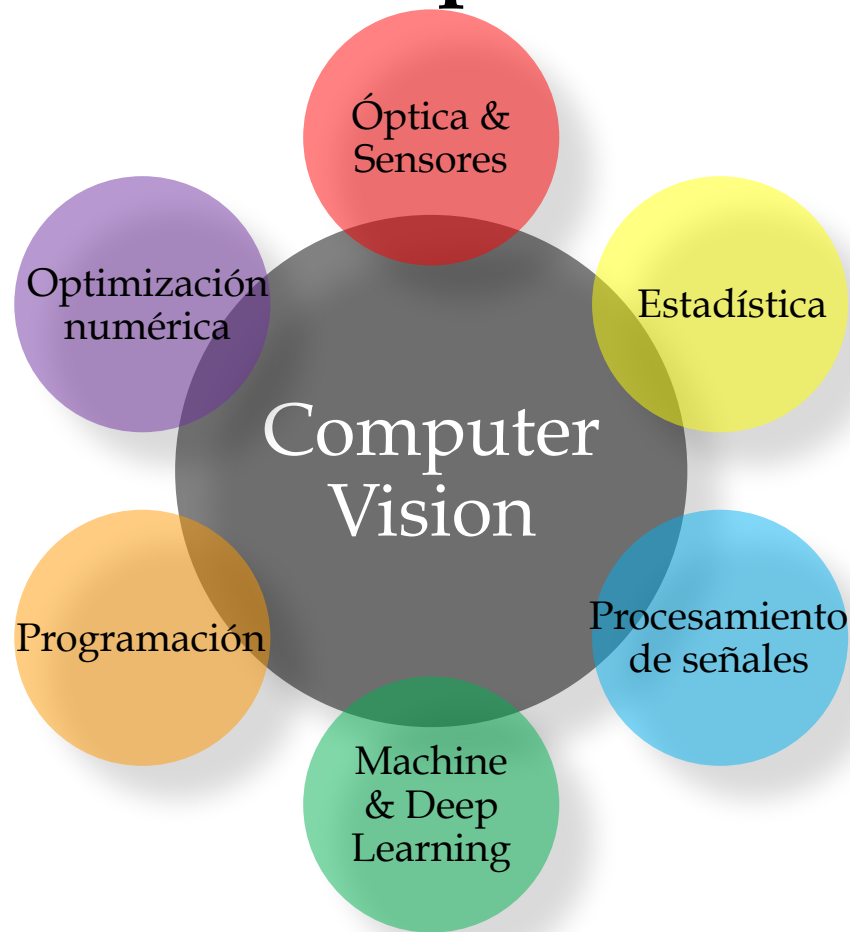
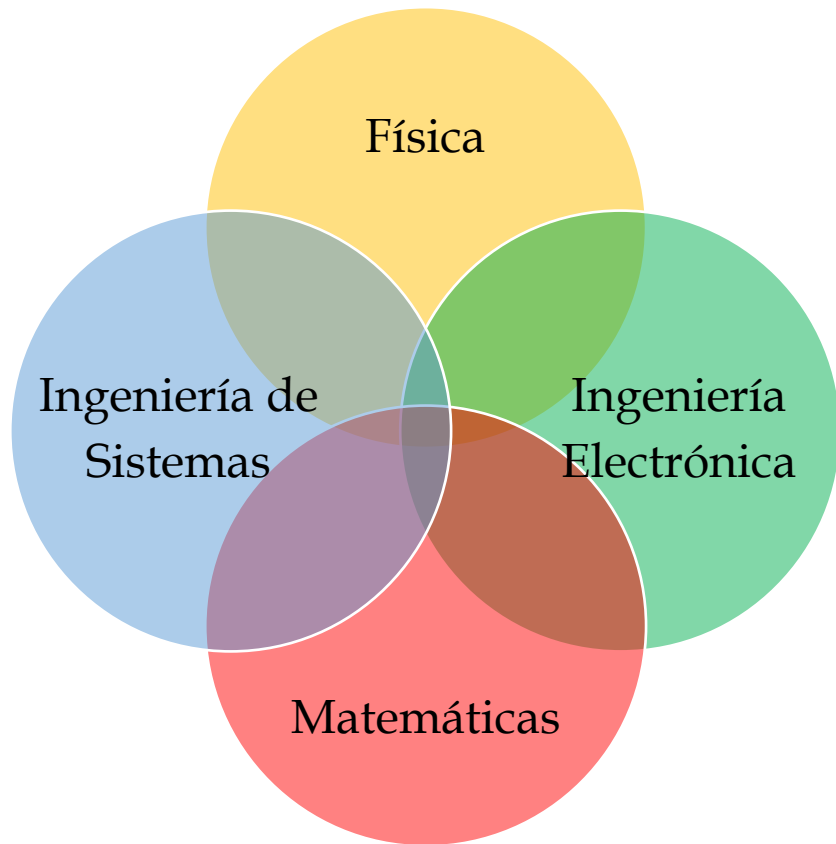
| | | | | | | | |
|----------|----------|-------|----------|----------|----------|----------|----------|
| Muffin ✓ | Dog ✓ | Dog ✗ | Muffin ✗ | Muffin ✗ | Dog ✗ | Muffin ✗ | Dog ✗ |
| Dog ✓ | Muffin ✓ | Dog ✓ | Muffin ✓ | Dog ✗ | Dog ✓ | Muffin ✓ | Muffin ✗ |
| Dog ✗ | Muffin ✗ | Dog ✗ | Dog ✓ | Muffin ✗ | Dog ✗ | Dog ✓ | Dog ✗ |
| Dog ✓ | Muffin ✓ | Dog ✓ | Dog ✗ | Dog ✗ | Muffin ✗ | Dog ✗ | Dog ✓ |

Each cell indicates whether the image is of a Dog (Chihuahua) or a Muffin.

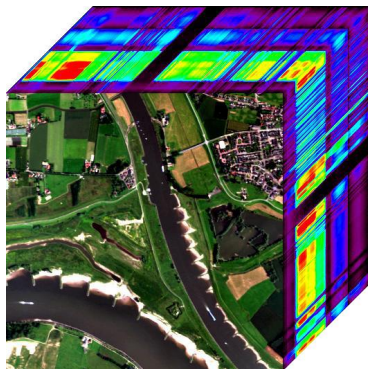
CV is still an open problem



CV = Área de acción interdisciplinaria



Áreas de Investigación



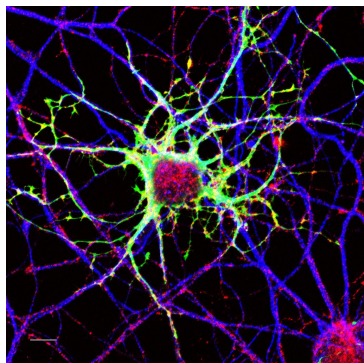
Hyperspectral imaging



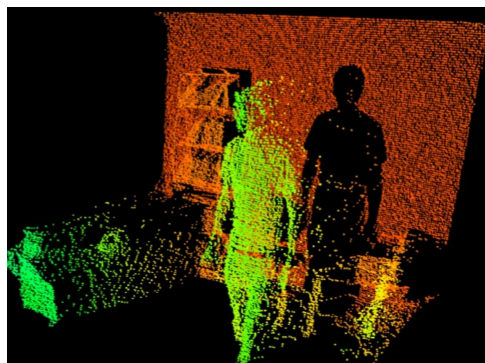
Depth imaging



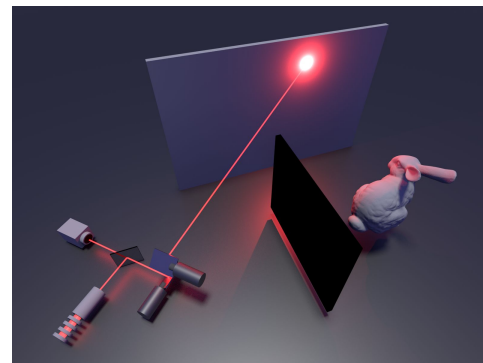
Infrared / Thermal Imaging



Microscopy



Single-photon imaging



Non-light-of-sight imaging



Hoover Rueda-Chacón

FOLLOW

Assistant Professor, Universidad Industrial de Santander
Verified email at uis.edu.co

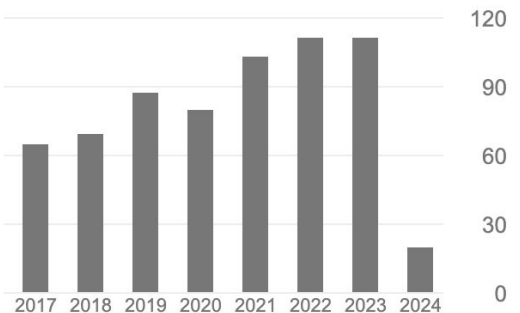
Computational imaging Compressive Sensing Spectral Imaging
Algorithms Optimization

GET MY OWN PROFILE

| TITLE | CITED BY | YEAR |
|--|----------|------|
| Higher-order computational model for coded aperture spectral imaging H Arguello, H Rueda, Y Wu, DW Prather, GR Arce Applied Optics 52 (10), D12-D21 | 150 | 2013 |
| Compressive hyperspectral imaging via approximate message passing J Tan, Y Ma, H Rueda, D Baron, GR Arce IEEE Journal of Selected Topics in Signal Processing 10 (2), 389-401 | 88 | 2016 |
| DMD-based implementation of patterned optical filter arrays for compressive spectral imaging H Rueda, H Arguello, GR Arce JOSAA 32 (1), 80-89 | 87 | 2015 |
| Multi-spectral compressive snapshot imaging using RGB image sensors H Rueda, D Lau, GR Arce Optics express 23 (9), 12207-12221 | 52 | 2015 |
| Classification of Hass avocado (persea americana mill) in terms of its ripening via hyperspectral images J Pinto, H Rueda-Chacón, H Arguello Tecnológicas 22 (45), 111-130 | 32 | 2019 |

Cited by [VIEW ALL](#)

| | All | Since 2019 |
|-----------|-----|------------|
| Citations | 819 | 513 |
| h-index | 14 | 13 |
| i10-index | 19 | 15 |

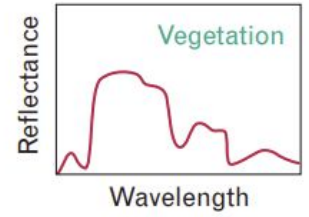
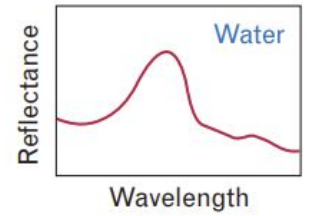
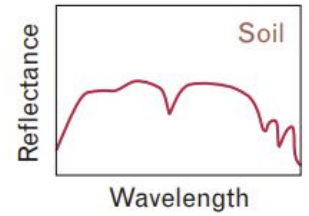
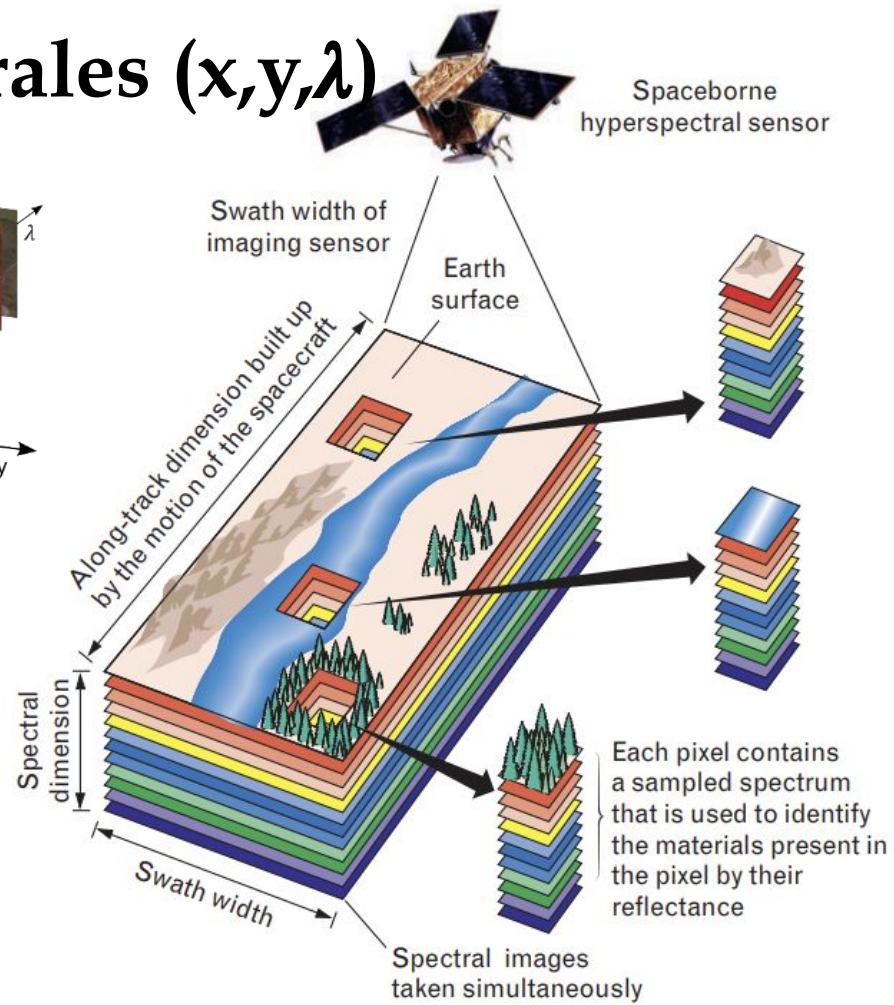
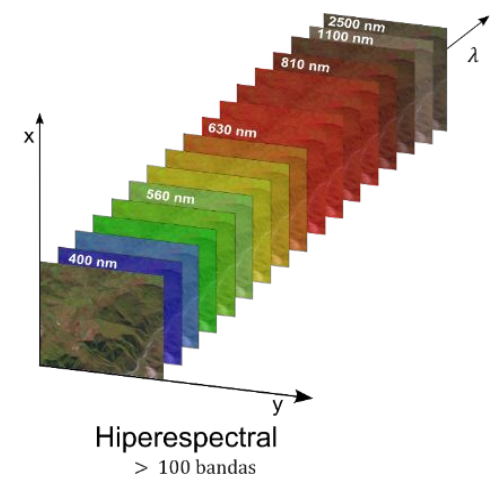
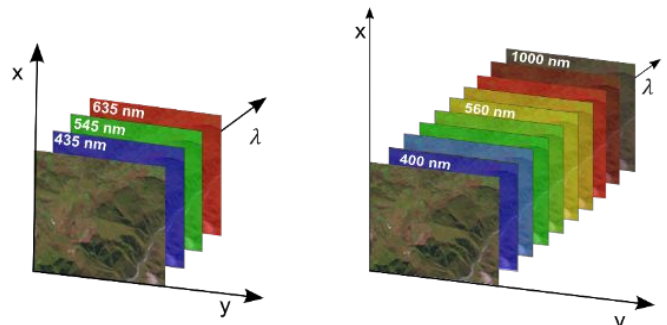


Public access [VIEW ALL](#)



Based on funding mandates

Imágenes espectrales (x, y, λ)



Imágenes espectrales (Aplicaciones)

0.4 – 0.7 μm

Visible

0.8 – 1 μm

NIR

0.4 – 0.7 μm

VISIBLE

1 – 2.5 μm

SWIR

VIS



SWIR



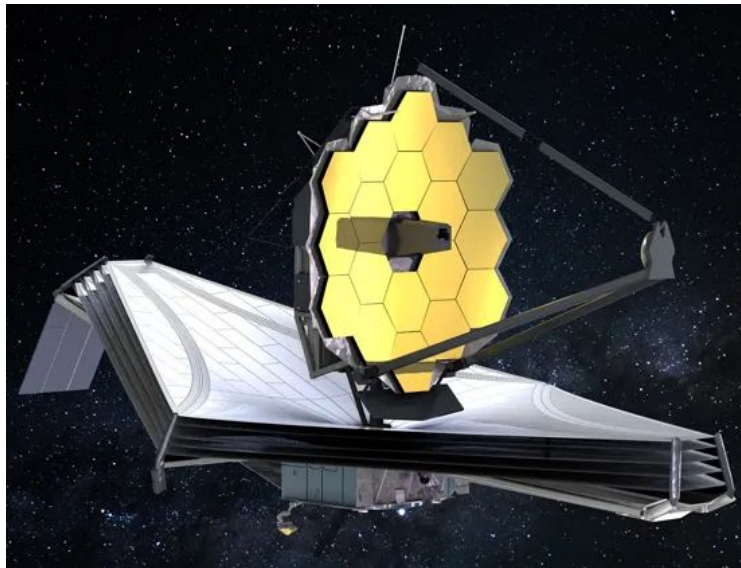
VIS



SWIR



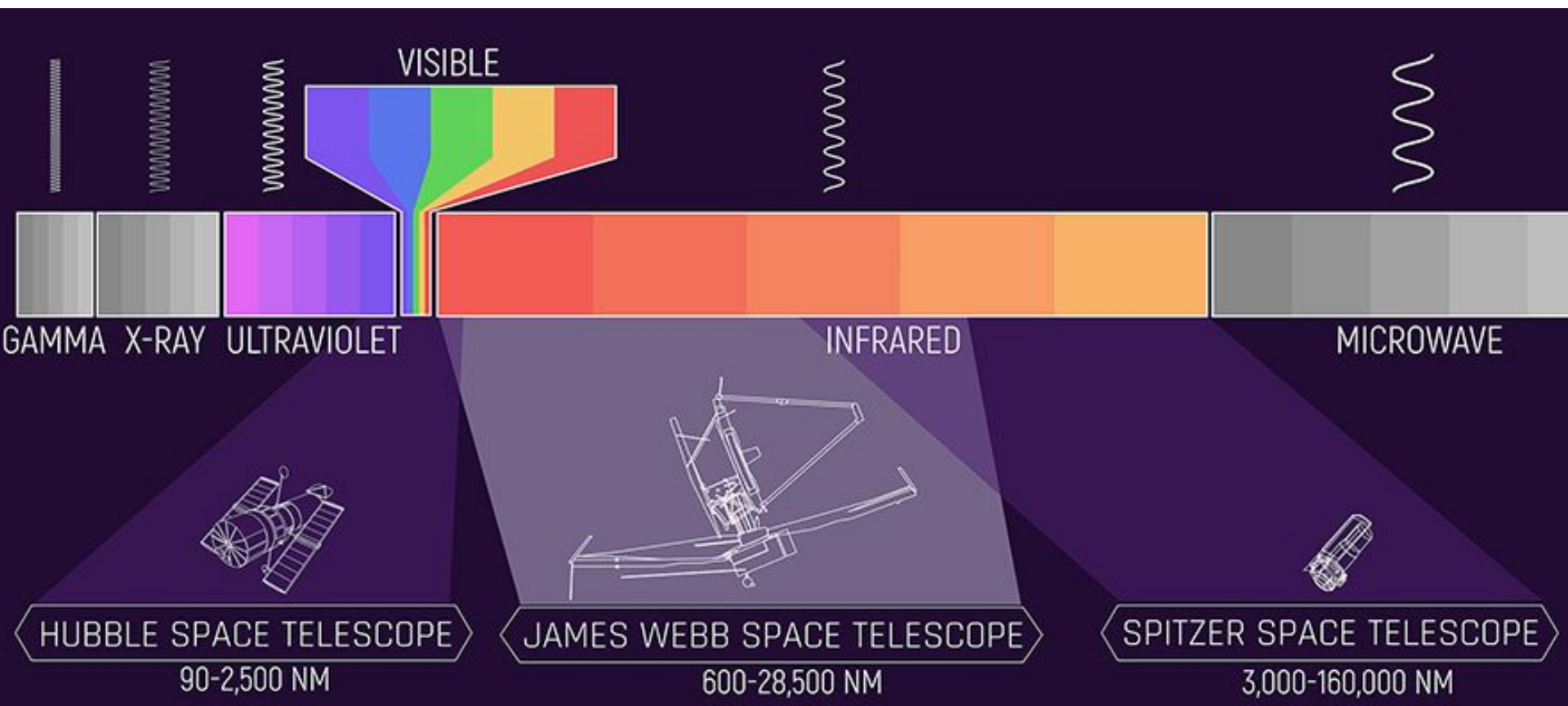
Deep Space



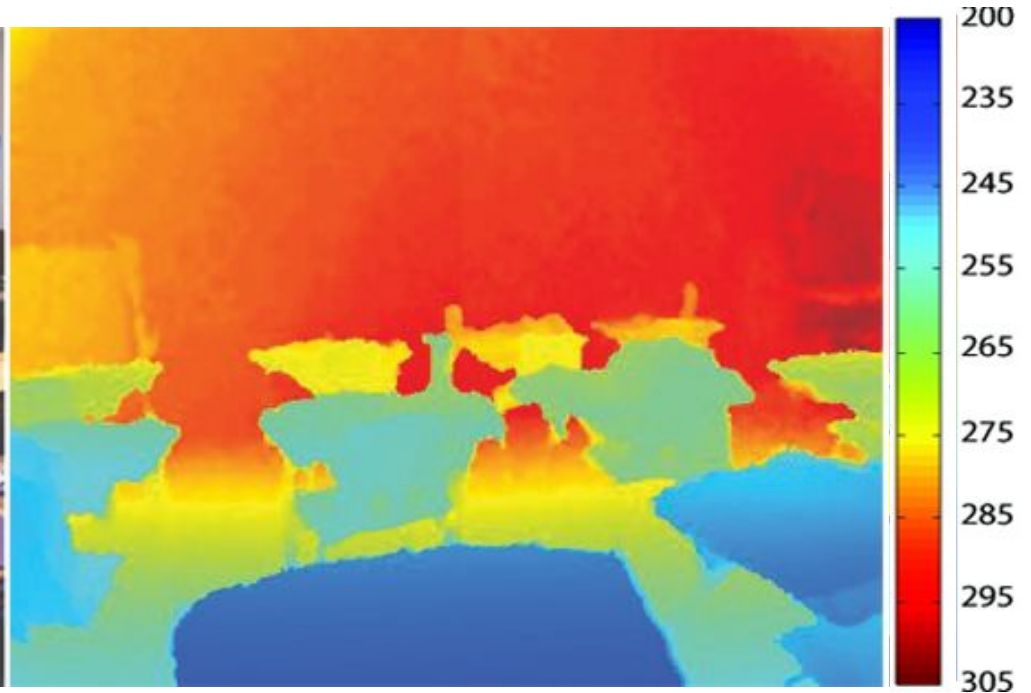
James Webb Space Telescope
(10 USD billion camera)



Sensibilidad del JWST



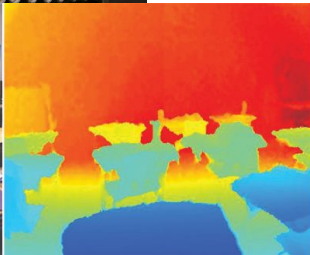
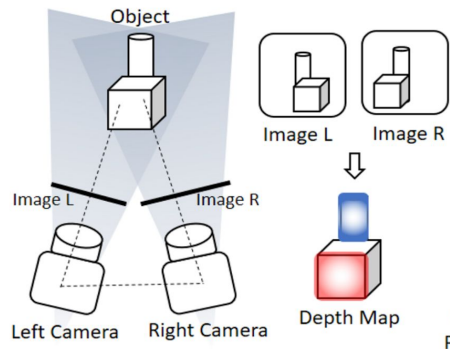
Imágenes de profundidad (x,y,z)



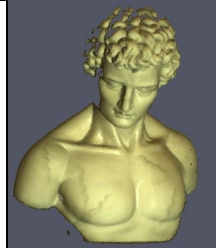
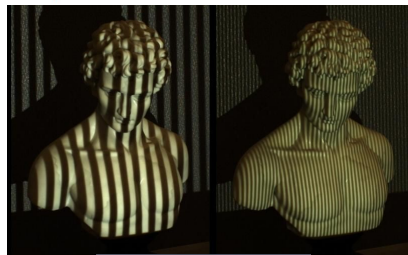
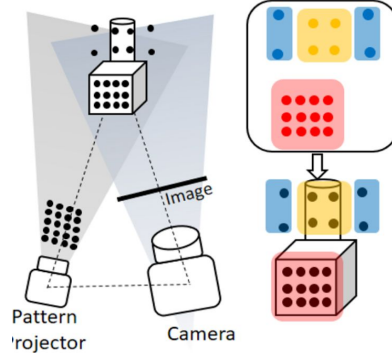
[cm]

Estimación de profundidad

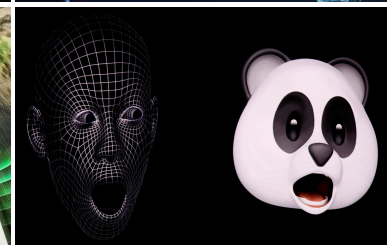
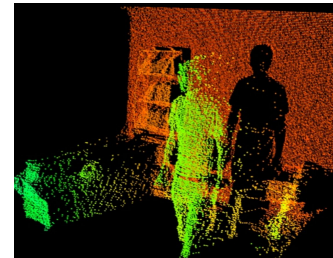
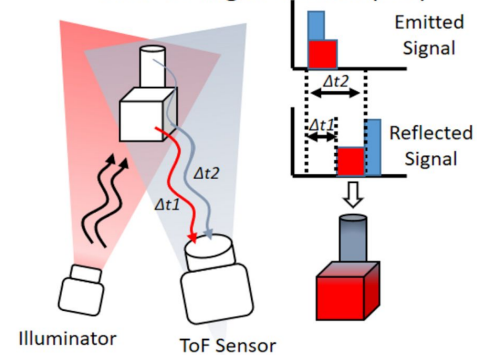
a Stereoscopic Vision



b Structured Light



c Time of Flight Camera (ToF)

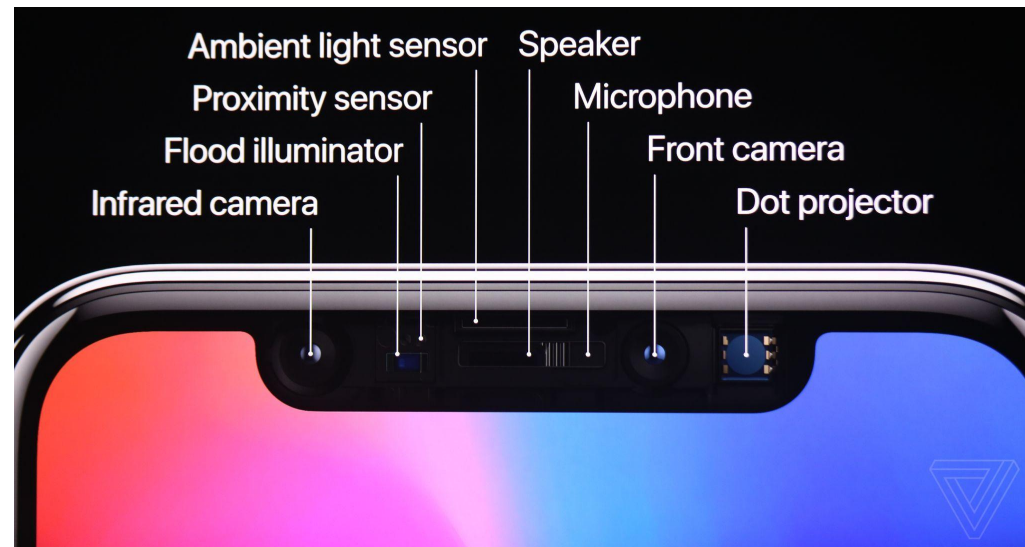




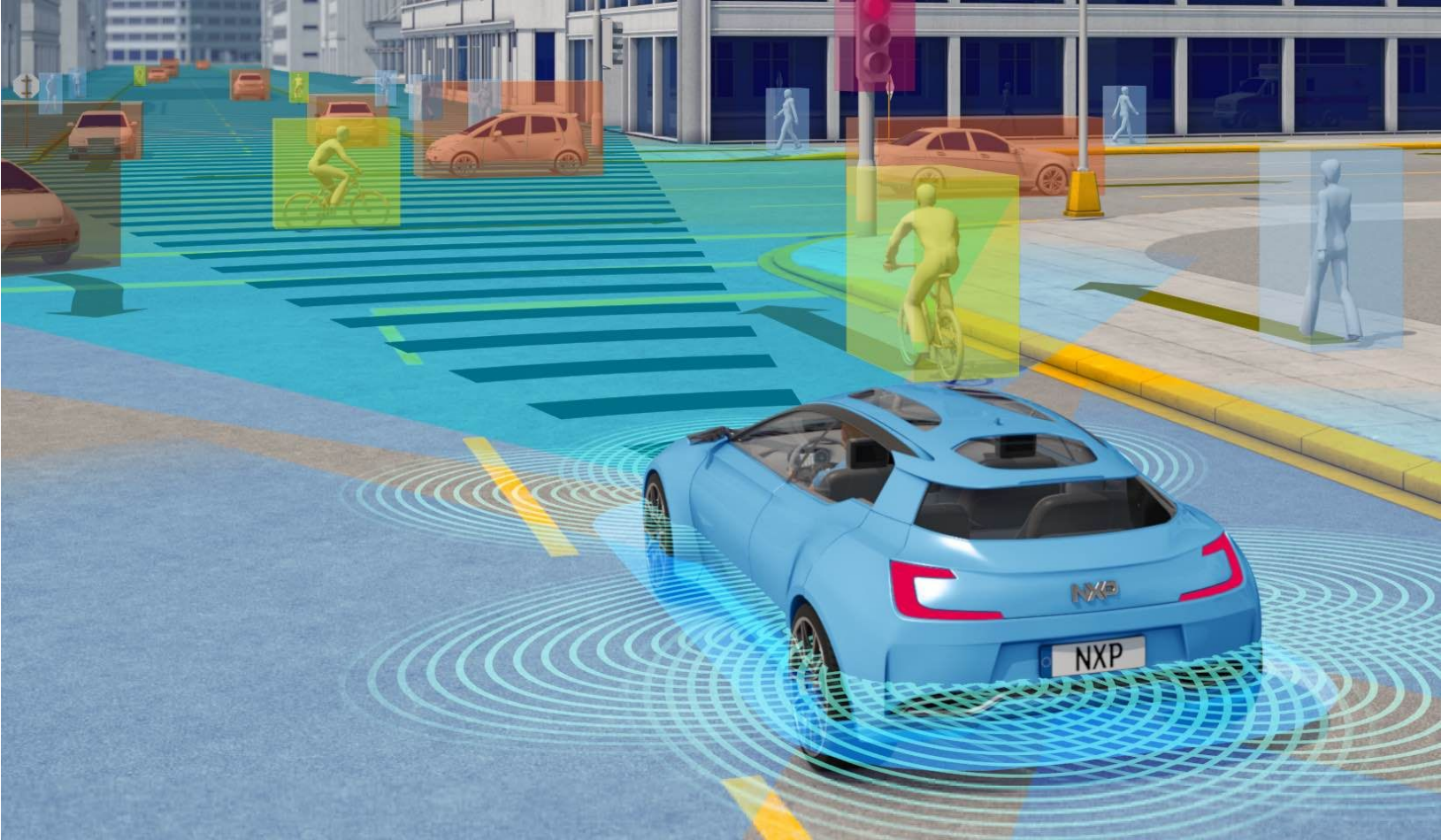
Input



Our depth predictions*

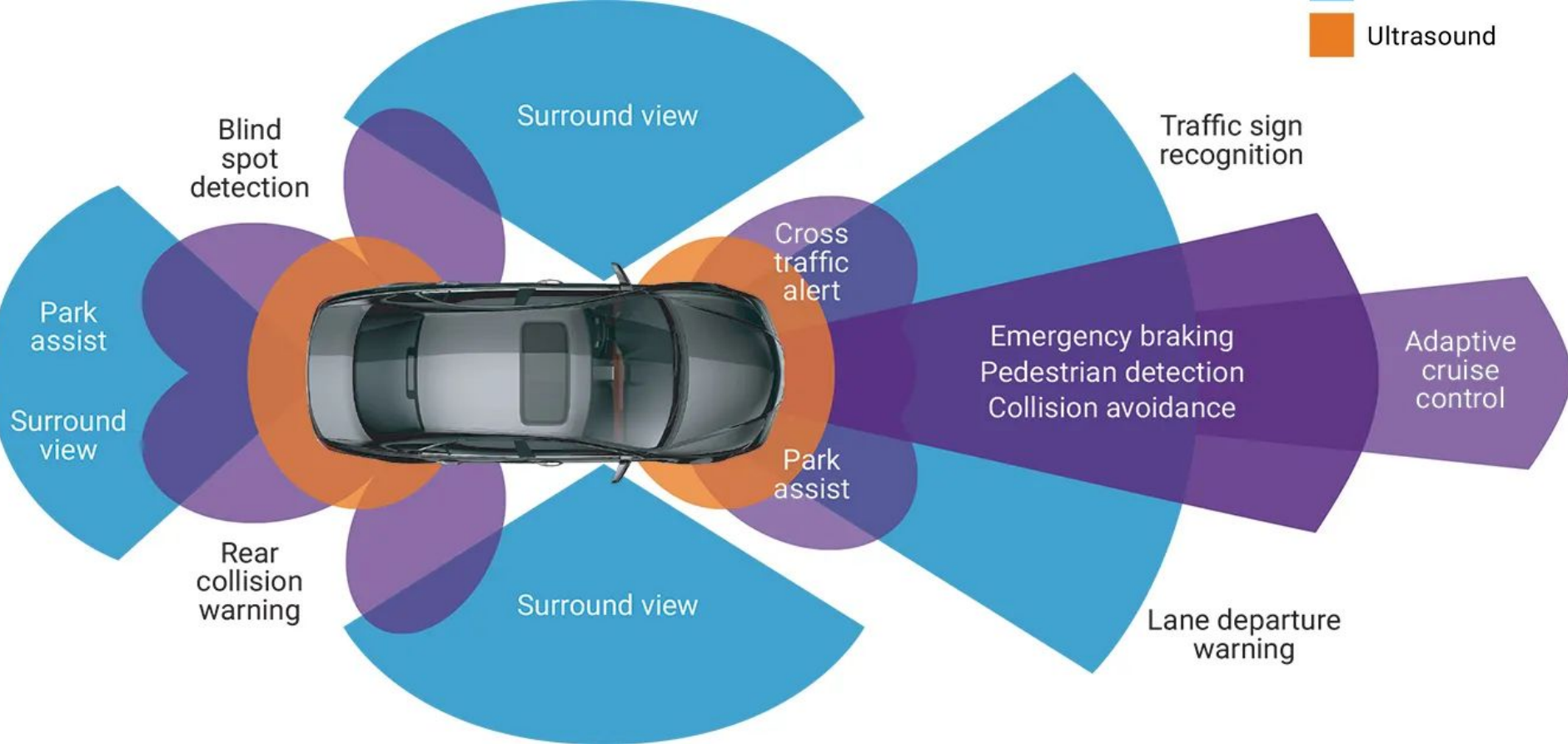


Vehículos autónomos



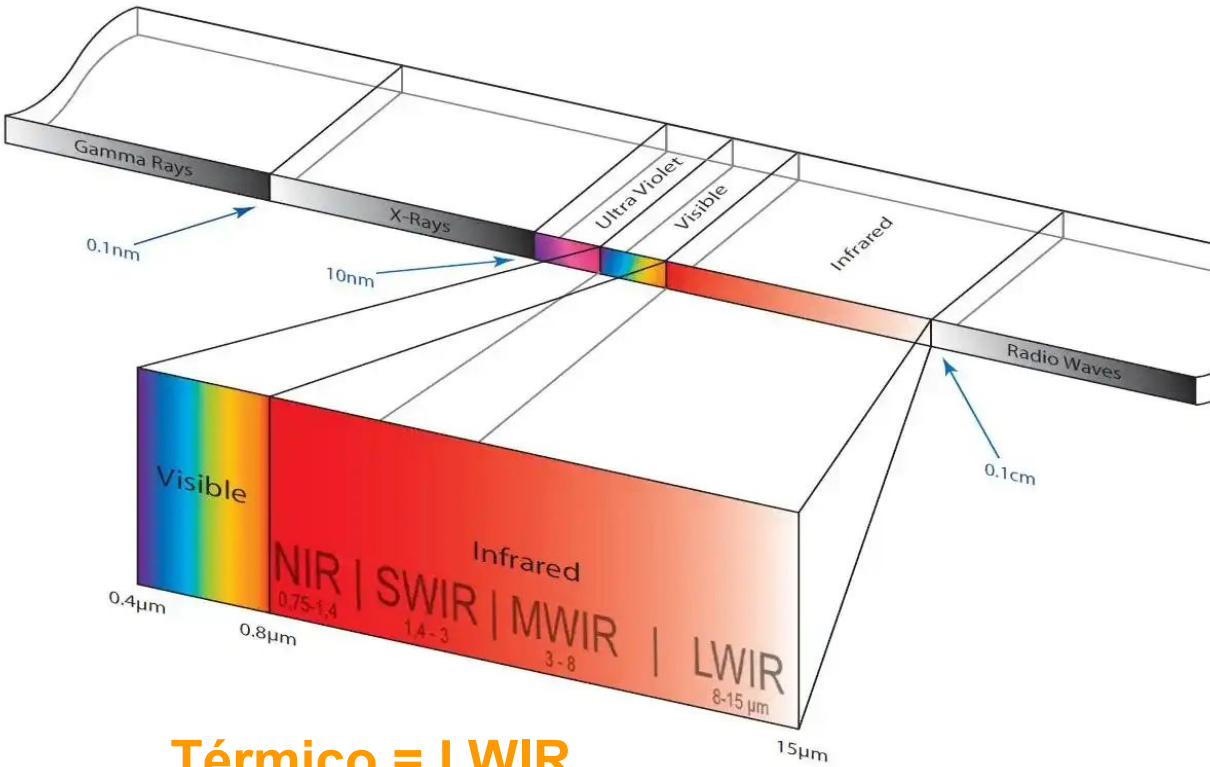
Vehículos autónomos (Sensores)

- Radar/LIDAR
- Camera
- Ultrasound

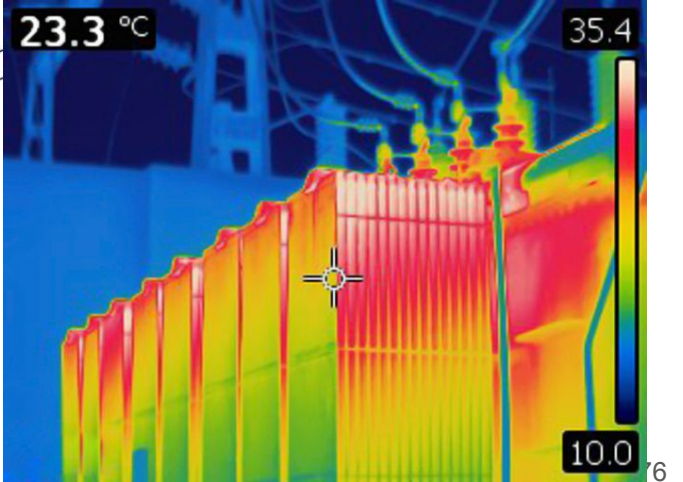




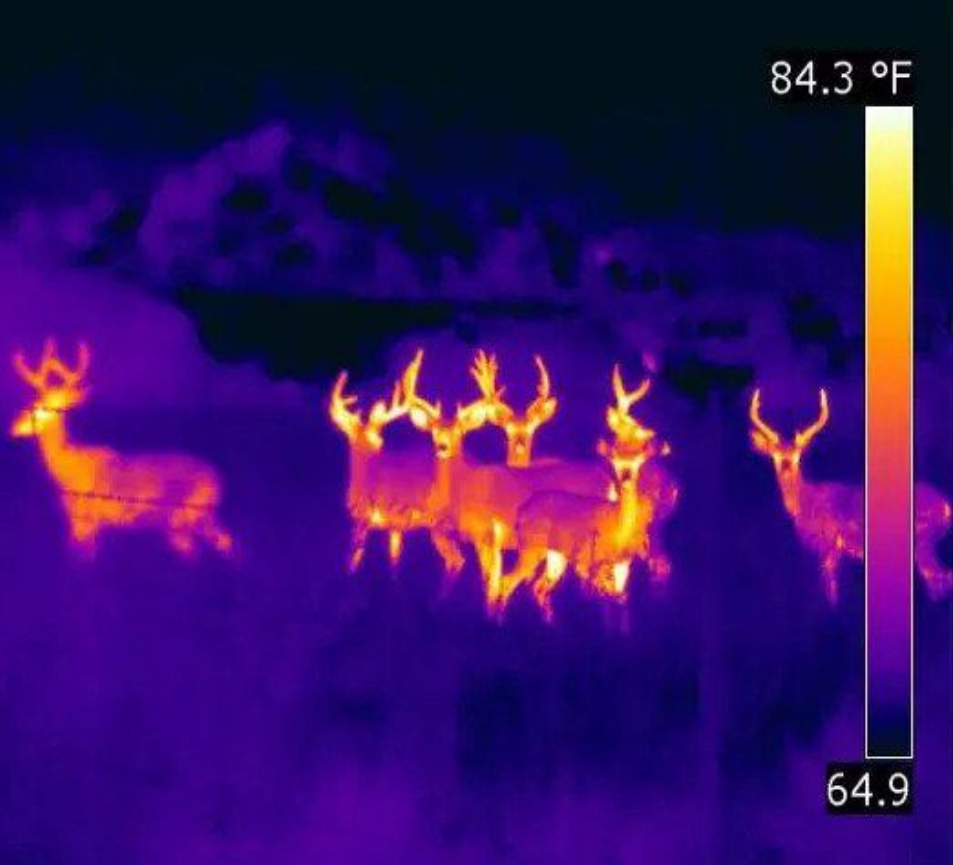
Imágenes térmicas



Térmico = LWIR



Imágenes térmicas





37,2°C

37,5°C

37°C

36,8°C

36,2°C

36,6°C

37,4°C

37,8°C

 FLIR

Pioneer

FLIR

FLIR



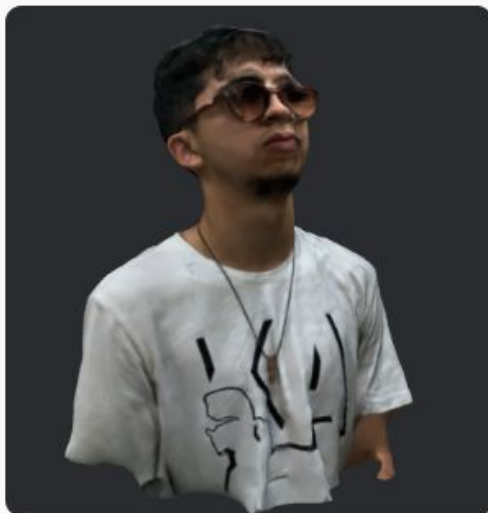
Demos

<https://semillero cv.github.io/galeria.html>

Galeria



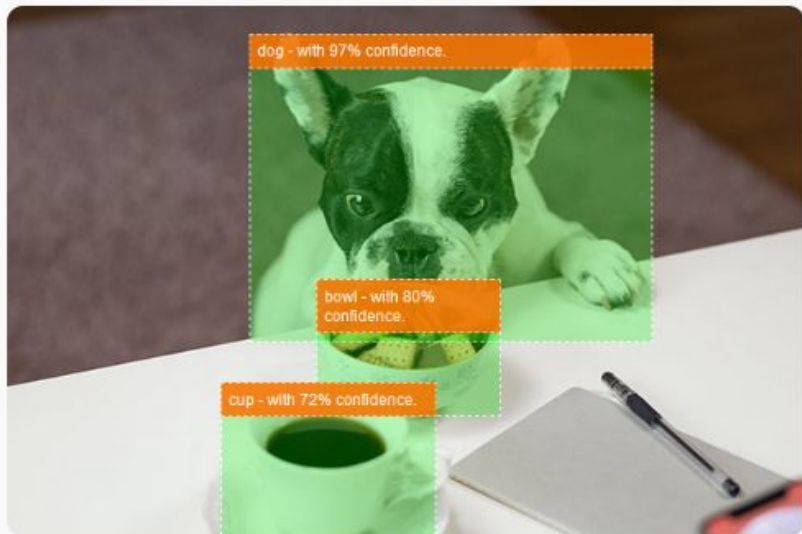
Lucha



Miguel



Escritorio



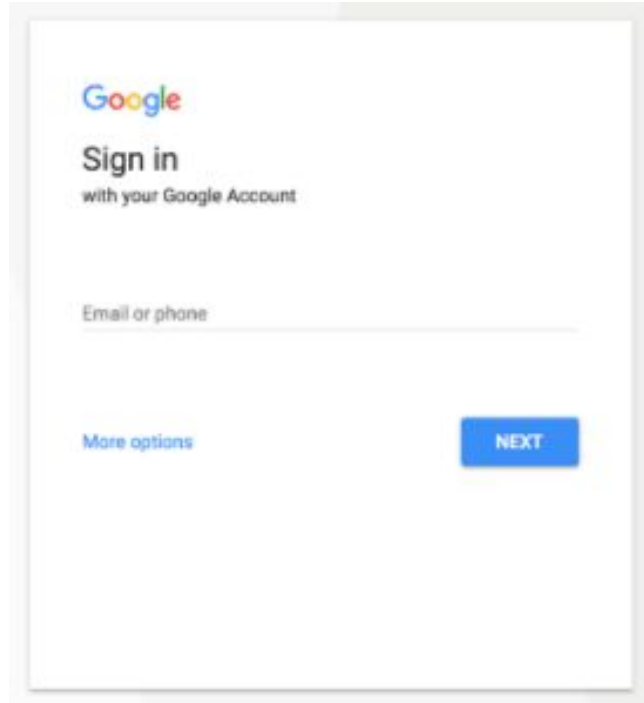
Deteccion de objetos



Estimacion de profundidad

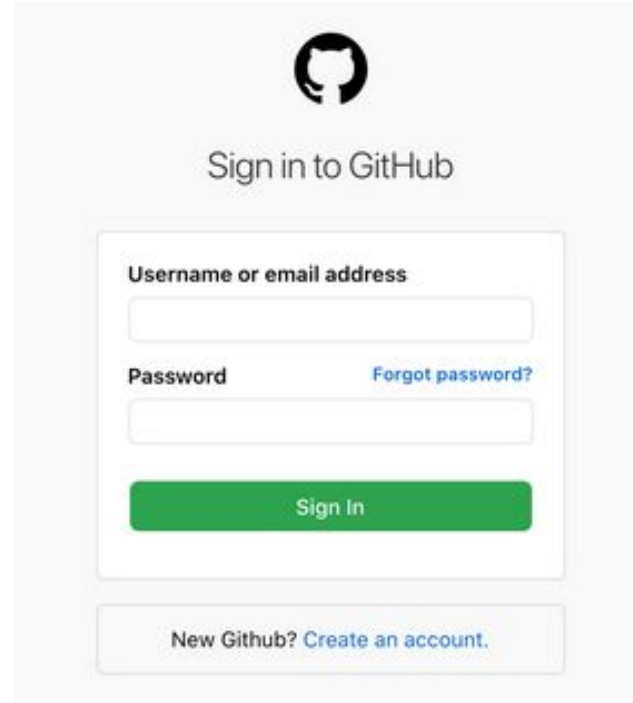
Setting up the Hands-On Experience

Inicia sesión en Google



The image shows the Google sign-in page. At the top left is the Google logo. Below it, the text reads "Sign in with your Google Account". There is a text input field labeled "Email or phone". At the bottom left, there is a link for "More options". At the bottom right, there is a blue button labeled "NEXT".

Inicia sesión en GitHub



The image shows the GitHub sign-in page. At the top center is the GitHub logo. Below it, the text reads "Sign in to GitHub". There is a text input field labeled "Username or email address". Below that is another text input field labeled "Password". To the right of the password field is a link for "Forgot password?". At the bottom of the form is a green button labeled "Sign In". Below the form is a link for "New Github? Create an account."

Entra al repositorio

<> Code Issues Pull requests Actions Security Insights Settings

Hands-on-Computer-Vision Public Edit Pins Watch 0 Fork 2 Star 1


main 1 Branch 0 Tags Go to file Add file Code

Factral added readme aa1296d · now 33 Commits

| | | |
|------------|-----------------------------|---------------|
| Sesiones | added structure for sesion2 | 6 minutes ago |
| .gitignore | first naive configuration | 2 months ago |
| README.MD | added readme | now |
| logo.png | added readme | now |

README

Semillero "Hands-on Computer Vision"



About

semillero computer vision

semillero cv.github.io/

computer-vision deep-learning cv

courses hands-on

- Readme
- Activity
- Custom properties
- 1 star
- 0 watching
- 2 forks

Report repository

Languages

- Jupyter Notebook 100.0%

Haz fork

Dale una estrella!

<> Code Issues Pull requests Actions Security Insights Settings

Hands-on-Computer-Vision Public

Edit Pins Watch 0 Fork 2 Star 1

main 1 Branch 0 Tags


Go to file Add file Code

Factral added readme aa1296d · now 33 Commits

| | | |
|------------|-----------------------------|---------------|
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README

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Readme Activity Custom properties 1 star 0 watching 2 forks Report repository

Languages

- Jupyter Notebook 100.0%

Haz fork

Create a new fork

A *fork* is a copy of a repository. Forking a repository allows you to freely experiment with changes without affecting the original project. [View existing forks.](#)

Required fields are marked with an asterisk (*).

Owner *



Repository name *

Hands-on-Computer-Vision

✔ Hands-on-Computer-Vision is available.

By default, forks are named the same as their upstream repository. You can customize the name to distinguish it further.

Description (optional)

semillero computer vision

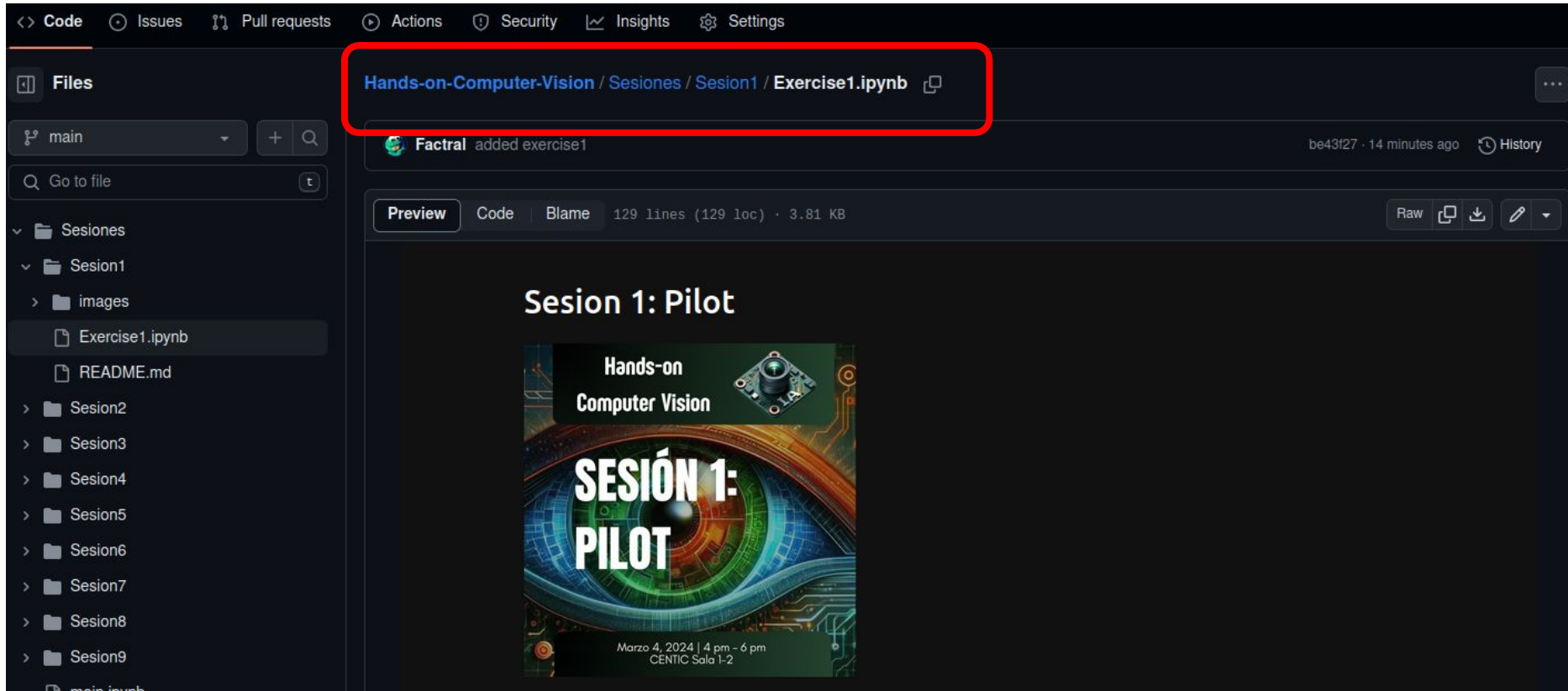
Copy the `main` branch only

Contribute back to semilleroCV/Hands-on-Computer-Vision by adding your own branch. [Learn more.](#)

You are creating a fork in your personal account.

Create fork



Abre el primer notebook



The screenshot shows the GitHub web interface for a repository named "Hands-on-Computer-Vision". The breadcrumb path is "Sesiones / Sesion1 / Exercise1.ipynb", which is highlighted with a red rectangle. The file explorer on the left shows a directory structure with folders "Sesiones", "Sesion1", "Sesion2", "Sesion3", "Sesion4", "Sesion5", "Sesion6", "Sesion7", "Sesion8", and "Sesion9", and files "Exercise1.ipynb" and "README.md".

The main content area displays the notebook "Exercise1.ipynb" in preview mode. The notebook title is "Sesion 1: Pilot". The content includes a graphic with the text "Hands-on Computer Vision" and "SESIÓN 1: PILOT". The graphic also features a circuit board with a green LED and the text "Marzo 4, 2024 | 4 pm - 6 pm" and "CENTIC Sala 1-2".

Compartelo a colab usando “githubtocolab”

  <https://github.com/semilleroCV/Hands-on-Computer-Vision/blob/main/Sesiones/Sesion1/Exercise1.ipynb>



Agrega la palabra “tocolab” y da ENTER

 <https://githubtocolab.com/semilleroCV/Hands-on-Computer-Vision/blob/main/Sesiones/Sesion1/Exercise1.ipynb>

Guarda tus cambios!

Copy to GitHub

Repository: [🔗](#)
Factral/Hands-on-Computer-Vision ▾

Branch: [🔗](#)
main ▾

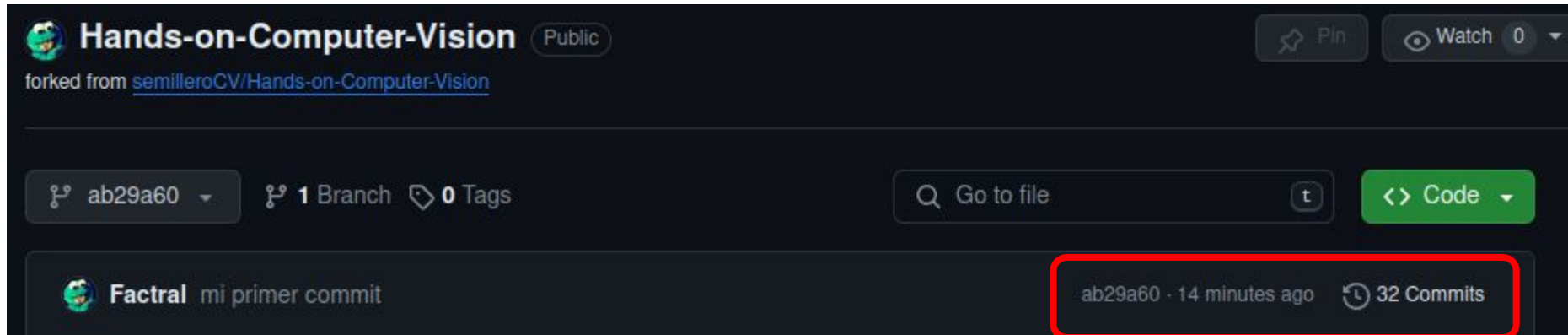
File path
Sesiones/Sesion1/Exercise1.ipynb

Commit message
Created using Colaboratory

Include a link to Colab

Cancel OK

Verifica el commit



The screenshot shows the GitHub interface for a repository named "Hands-on-Computer-Vision". The repository is public and was forked from "semilleroCV/Hands-on-Computer-Vision". The current commit hash is "ab29a60", with 1 branch and 0 tags. A search bar for "Go to file" and a "Code" button are visible. A commit by user "Factral" is highlighted with a red box, showing the commit hash "ab29a60" and the time "14 minutes ago", along with a clock icon and the text "32 Commits".

Hands-on-Computer-Vision Public
forked from [semilleroCV/Hands-on-Computer-Vision](#)

ab29a60 1 Branch 0 Tags

Go to file Code

Factral mi primer commit
ab29a60 · 14 minutes ago 32 Commits

Paso a paso

1. Creación/inicio de sesión de cuenta de gmail para acceder a colab
2. Creación/inicio de sesión de cuenta de github
3. Práctica
 - 3.1. Entrar al github del semillero (el link se encuentra en nuestra página web)
 - 3.2. Hacer un fork de todo el repositorio
 - 3.3. Abrir el notebook (*.ipynb) que se encuentra en la carpeta de la Sesión 1
 - 3.4. Abrir el notebook en colab usando **githubtocolab**
 - 3.5. Editar el notebook con lo que se solicite en la sesión
 - 3.6. **Seleccionar file -> save a copy in github -> verificar repositorio, rama, poner el mensaje del commit y darle en enviar**
 - 3.7. Hacer el push
 - 3.8. **Verificar commit**

**Next
Week**

A Sony 7K 616 camera is shown from a front-three-quarter view. The camera is black and has a lens attached. The lens shows a sunset scene with a bright orange sun partially obscured by a dark horizon. The camera body has 'SONY' on the top, '7K 616' on the right side, and 'MULTIFLEX' on the left side. The lens has 'G OLYMPUS' visible on the bottom edge. The camera is resting on a surface of small, dark, pebbly stones. The background is a soft, out-of-focus sunset sky.

**SESIÓN 2:
DE FOTONES A
PIXELES**