



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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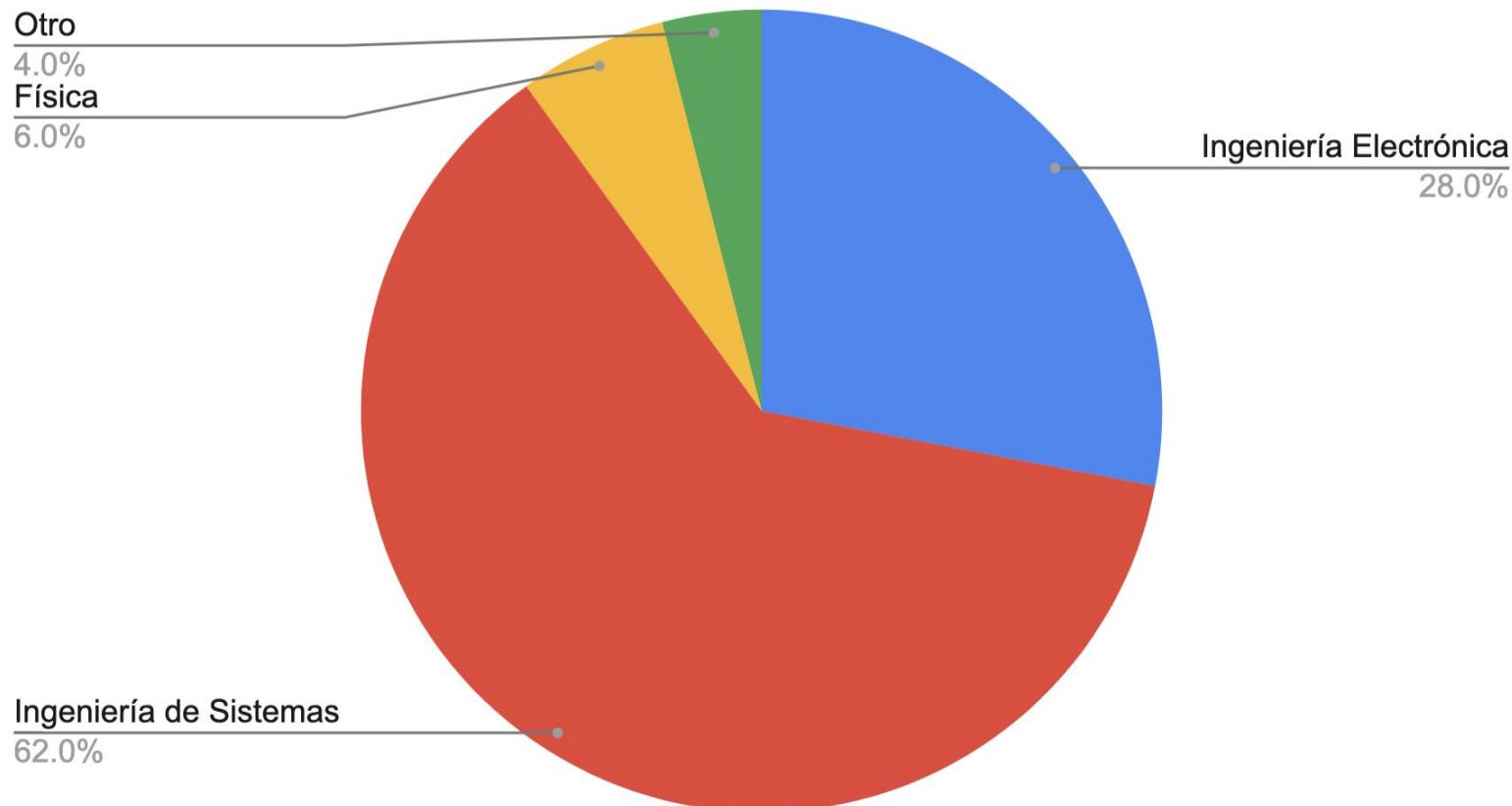


Oscar Ivan Torrens Bustamante

Estudiante de Ingeniería de Sistemas e
Informática

About the HoCV First Cohort (50/103)

Aceptados



About the HoCV First Cohort (50/103)

Aceptados

20

15

10

5

0

1.00

2.00

3.00

4.00

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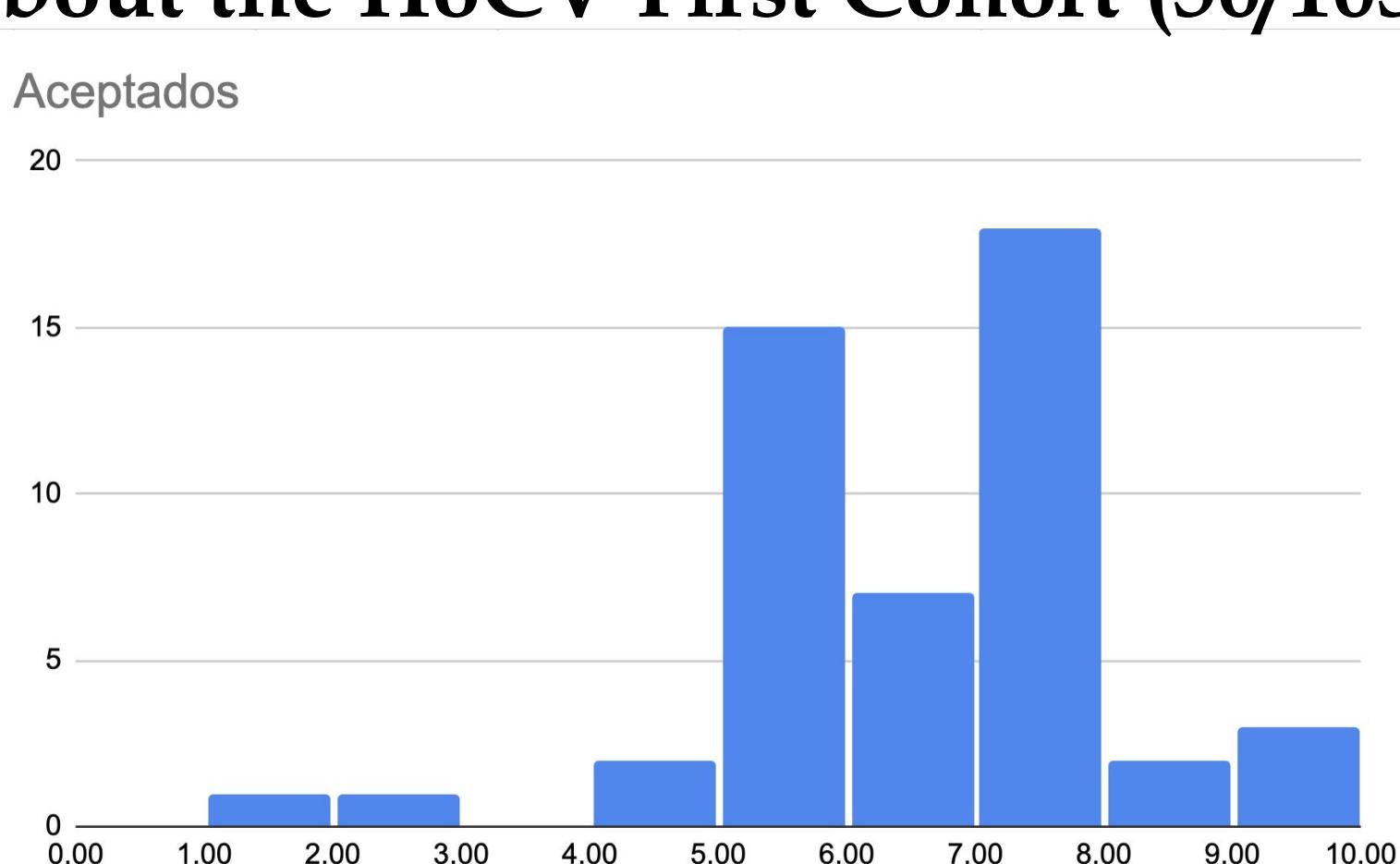
7.00

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10.00

6



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**

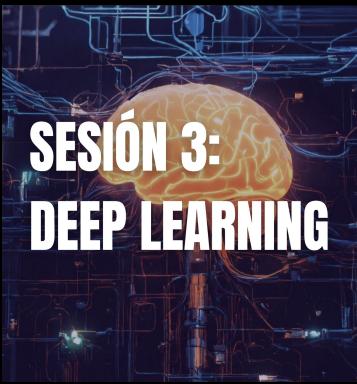
Dar a conocer áreas de acción **interdisciplinario** que demanda la industria actual

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



Cronograma

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

¿Evaluación?

“Demuestra que
quieres ser el mejor”

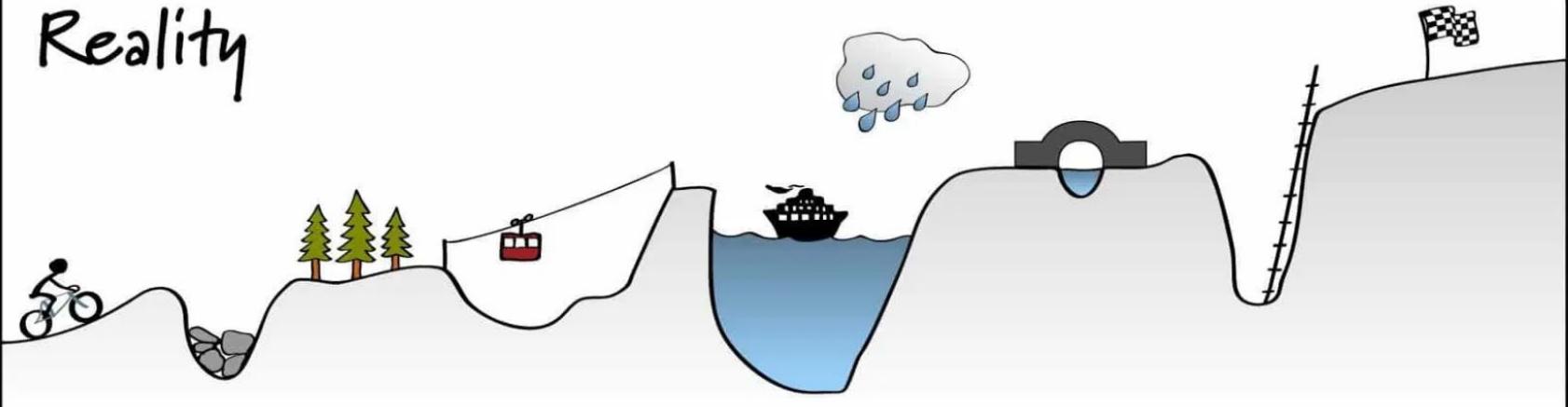
Y mantén una buena actitud!



Your Plan



Reality

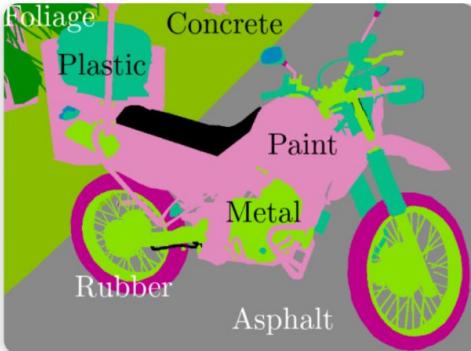


Recursos

<https://semillerocv.github.io/>

The screenshot shows the top navigation bar of the website. It features a small icon of a camera sensor on the left, followed by the text "Computer Vision". To the right are three menu items: "Inicio", "Sesiones", and "Galería". On the far right is a magnifying glass icon representing a search function.

Semillero Hands-on Computer Vision



Explora el Futuro de la Visión por Computadora

Únete a nosotros en el Semillero “Hands-on Computer Vision” y sumérgete en una experiencia única que fusiona la teoría con la práctica en un 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 de

! Únete al canal de Discord !



Herramientas



Declaración de Diversidad e Inclusión

Este semillero será un lugar donde serás tratado con respeto y dará la bienvenida a personas de todas las edades, orígenes, creencias, etnias, géneros, identidades de género, expresiones de género, orígenes nacionales, afiliaciones religiosas, orientaciones sexuales, habilidades y otros. Diferencias visibles y no visibles. Se espera que todos los miembros de esta semillero contribuyan a un ambiente respetuoso, acogedor e inclusivo.



The background of the slide features a row of six traffic light fixtures. Each fixture has a black housing and two circular lenses. The bottom lens of each fixture is illuminated with a bright green light. The top lens is dark and textured. The traffic lights are mounted on a dark metal pole. Above the traffic lights, there is a large, stylized red swoosh graphic that curves from the left side towards the right. In the upper right corner of the swoosh, there is a small red 'TM' symbol.

TM

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

VISION



David Marr

FOREWORD BY
Shimon Ullman
AFTERWORD BY
Tomaso Poggio

El mundo que nos rodea

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

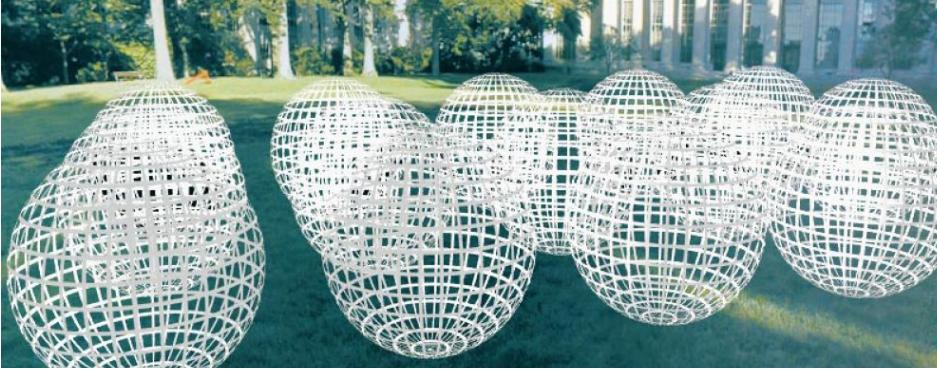
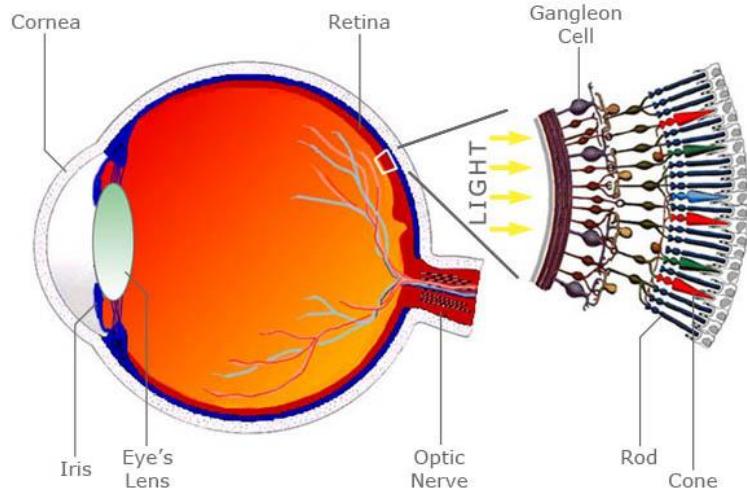
x, y, z : Posición en espacio 3D

λ : Longitud de onda (color)

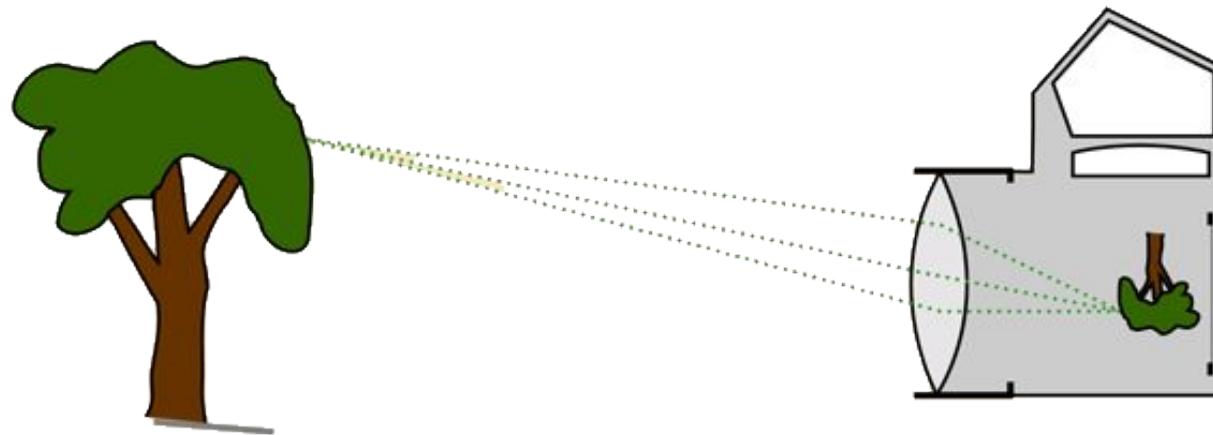
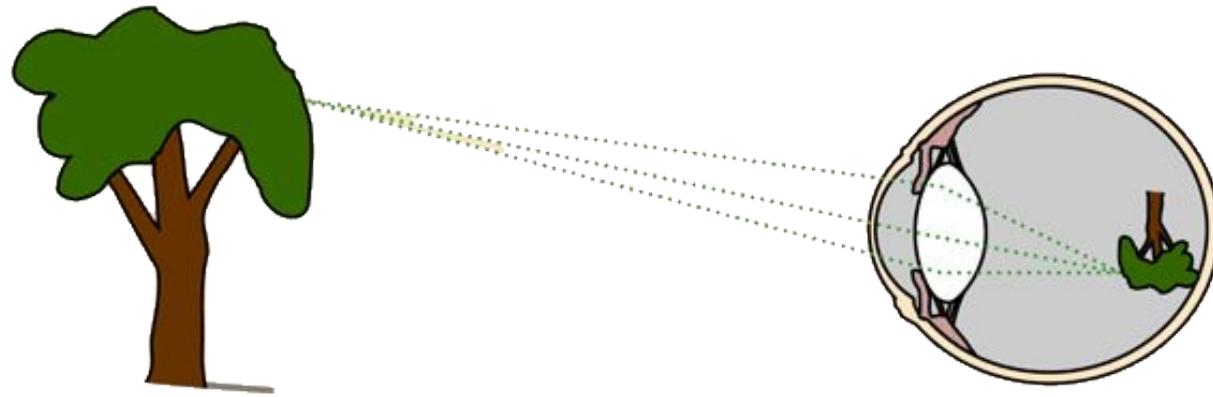
t : Tiempo

θ, ϕ : Angulo (latitud, longitud)

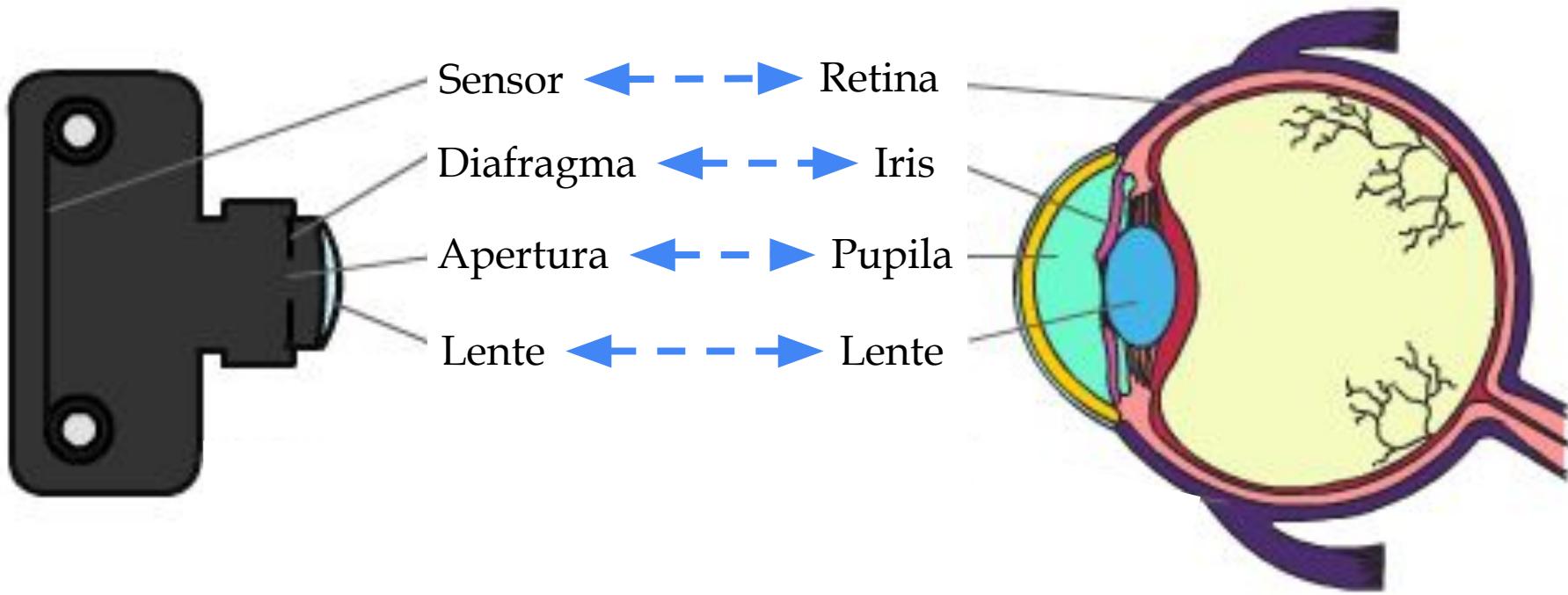
p : Polarización

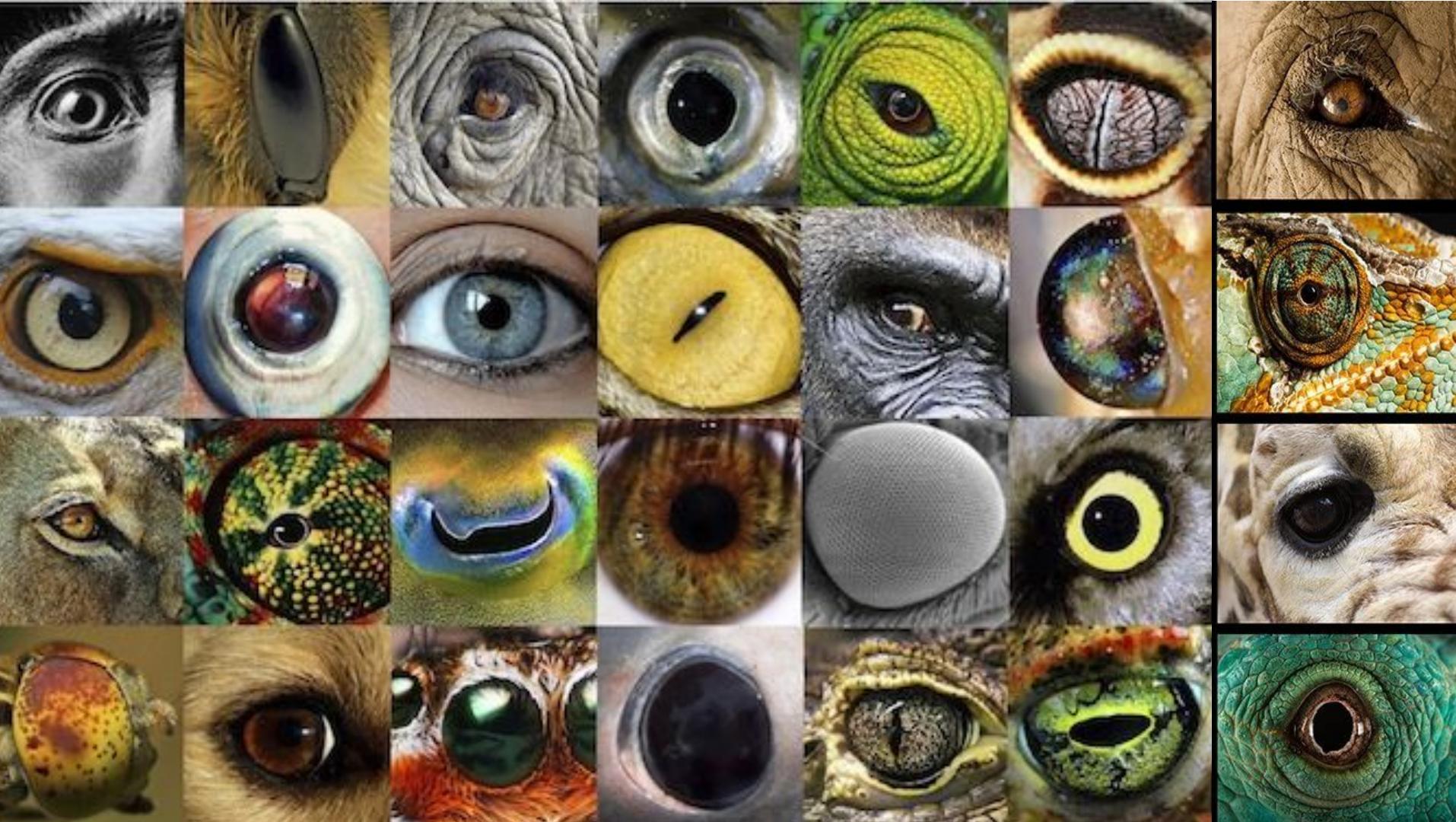


Una cámara se asimila al ojo humano



Similitudes

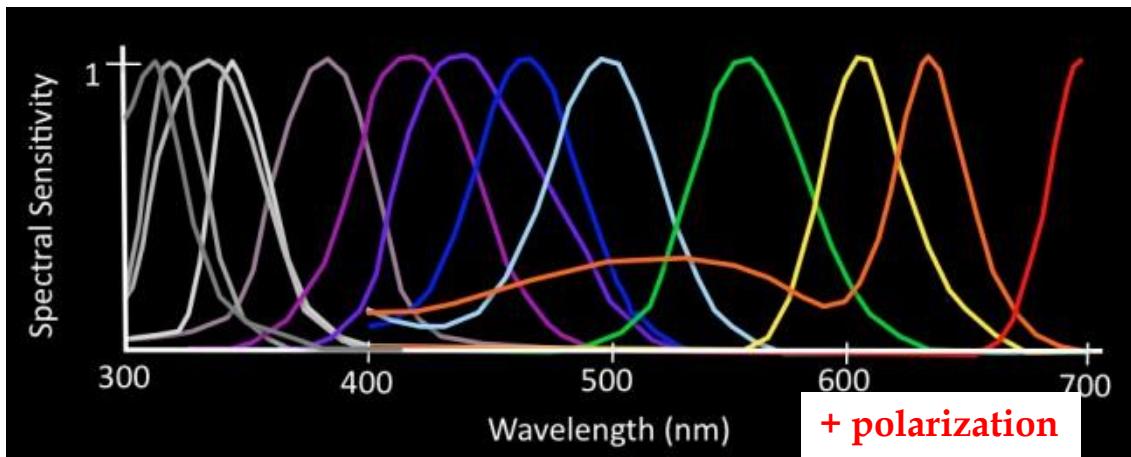
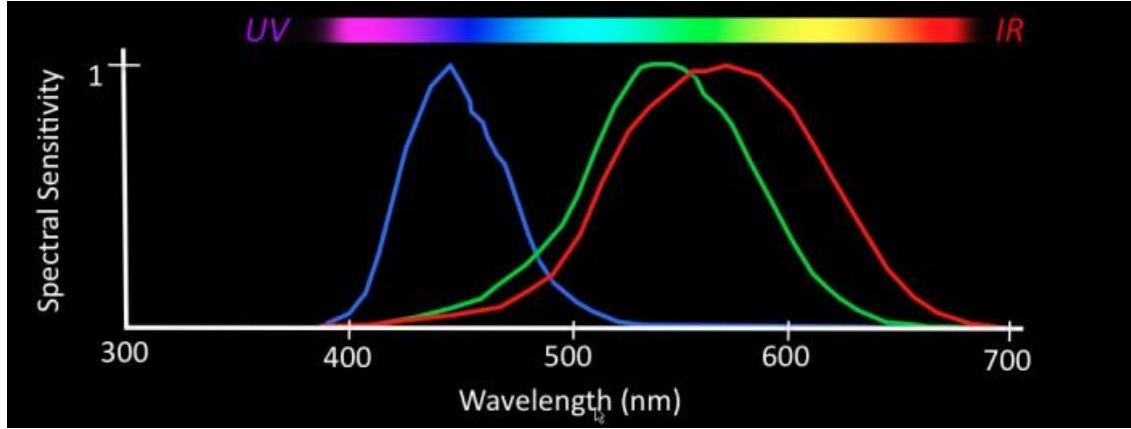
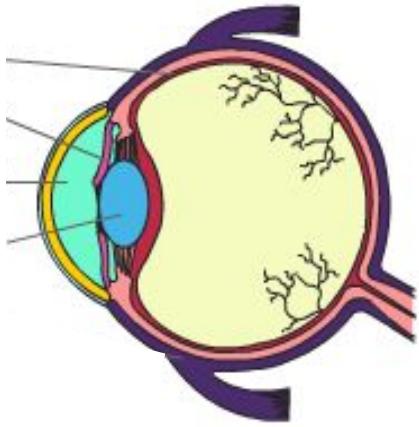








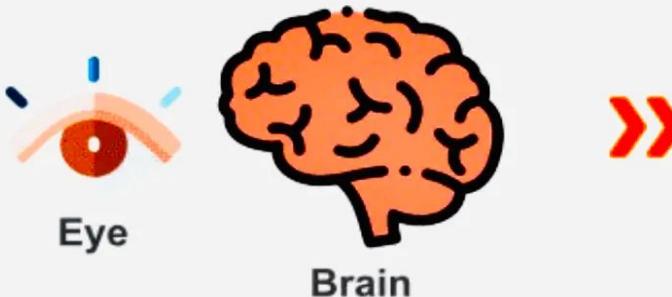
Humano vs. Camarón Mantis



¿Qué es Visión por Computadora?

Ayudando a las computadoras a “ver”

Human Vision



Bowl, Orange,
Banana, Peach,
Mandarin, Apple

Computer Vision



Bowl, Orange,
Banana, Peach,
Mandarin, Apple

Input

Sensing device

Interpreting device

Output

(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:

RO

You

what is computer vision?

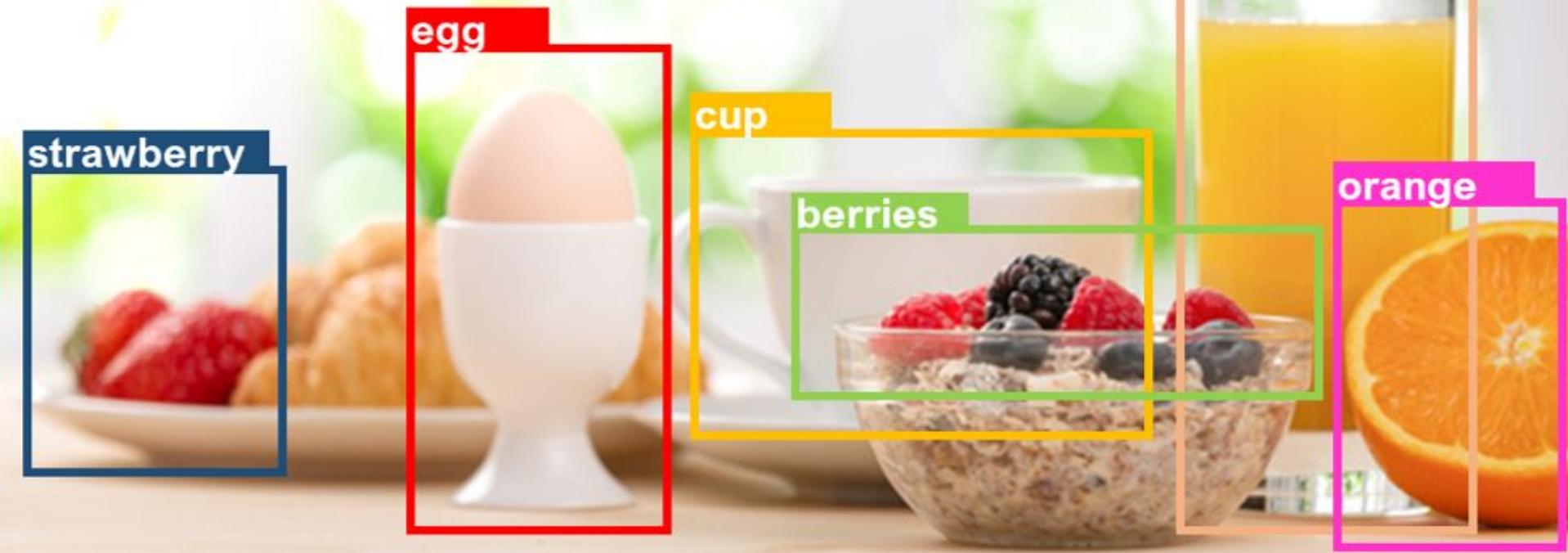


ChatGPT

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



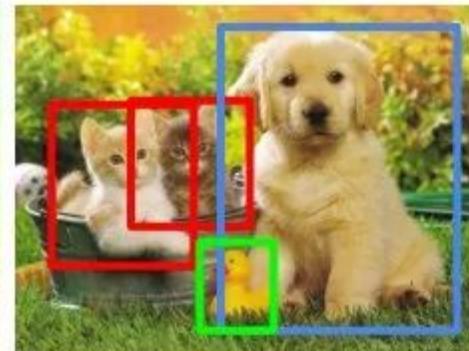
CAT

Classification + Localization



CAT

Object Detection



CAT, DOG, DUCK

Instance Segmentation

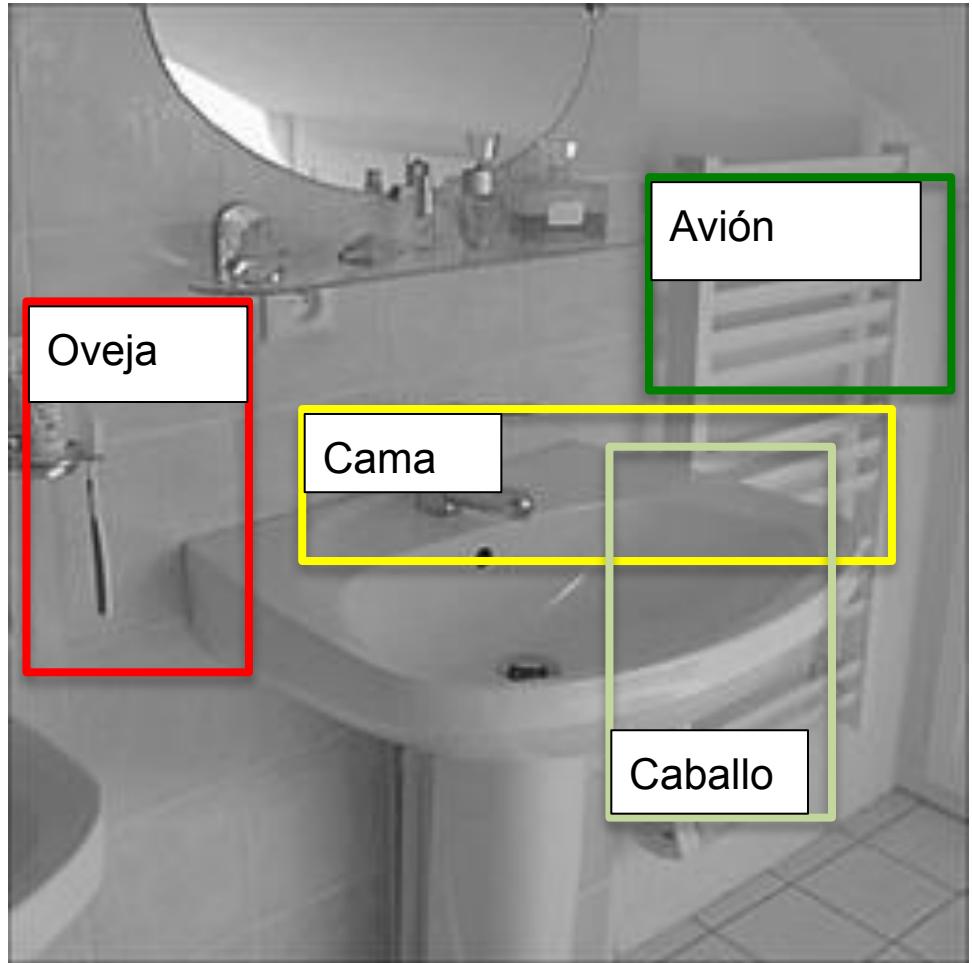


CAT, DOG, DUCK

Single object

Multiple objects

Primeros pasos de CV

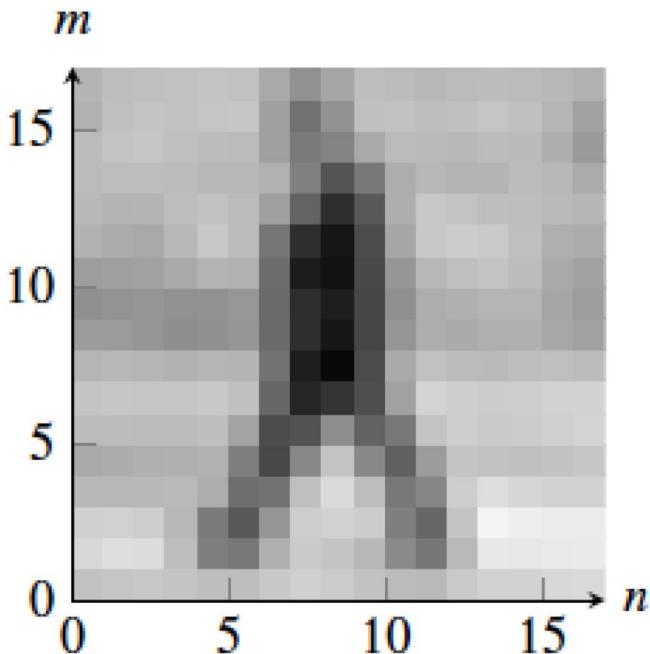


Hoy



¿Por qué es difícil “ver”?

Lo que nosotros “vemos”

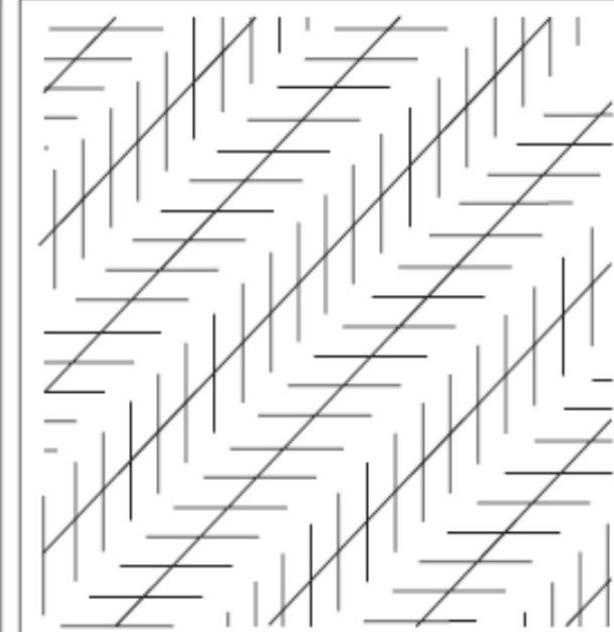


Lo que obtiene la máquina

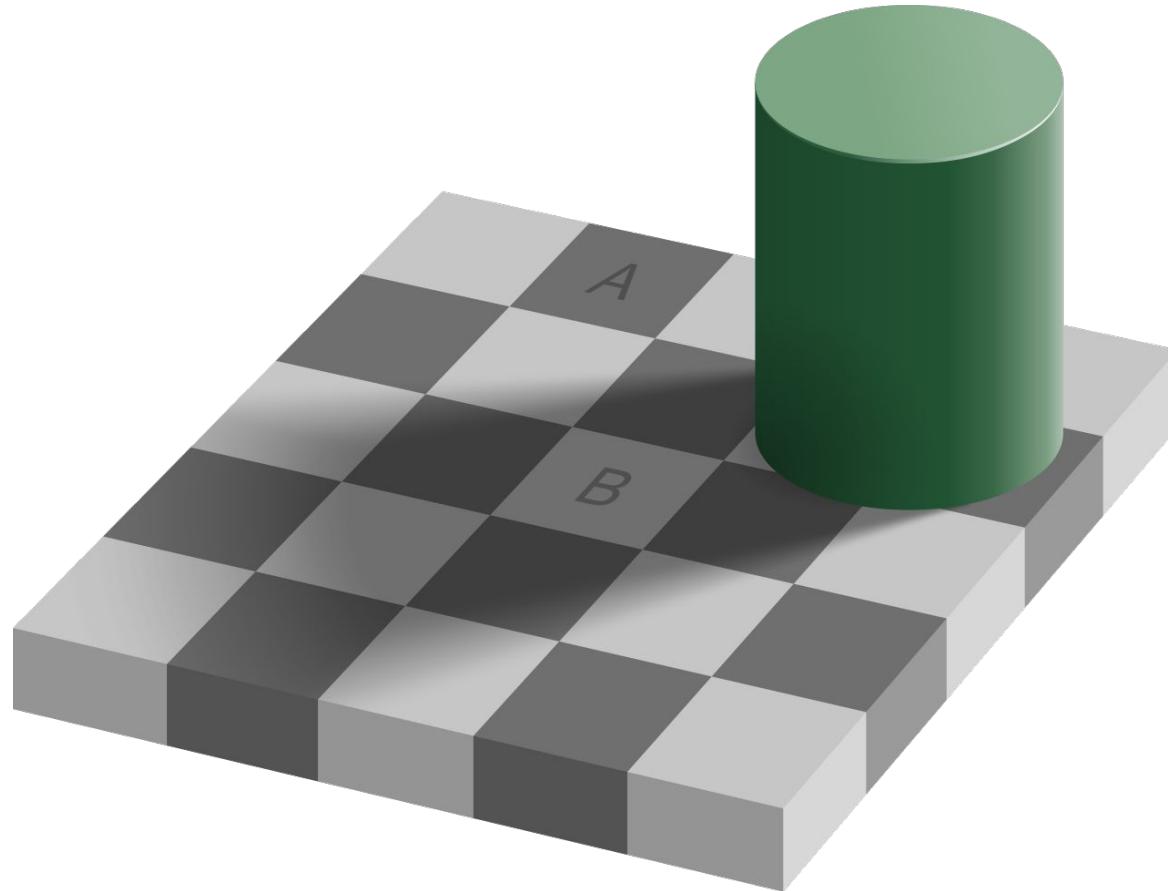
$I = \begin{bmatrix} 160 & 175 & 171 & 168 & 168 & 172 & 164 & 158 & 167 & 173 & 167 & 163 & 162 & 164 & 160 & 159 & 163 & 162 \\ 149 & 164 & 172 & 175 & 178 & 179 & 176 & 118 & 97 & 168 & 175 & 171 & 169 & 175 & 176 & 177 & 165 & 152 \\ 161 & 166 & 182 & 171 & 170 & 177 & 175 & 116 & 109 & 169 & 177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

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

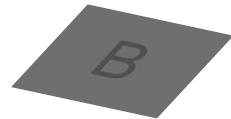
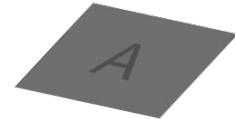
Ver: Percepción Humana vs. Medición Real



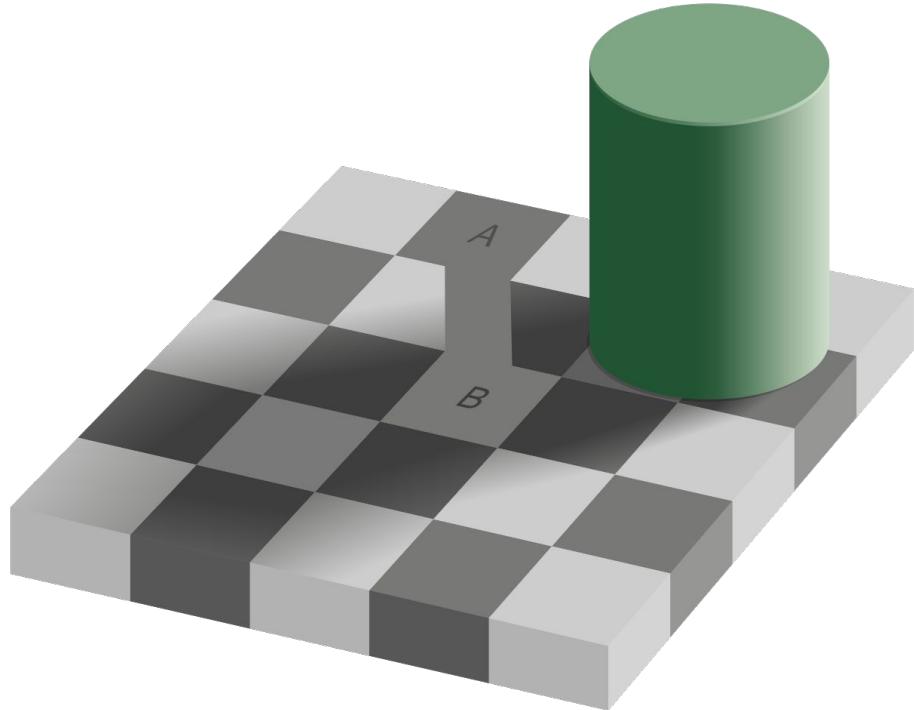
Ver: Percepción Humana vs. Medición Real



Ver: Percepción Humana vs. Medición Real



Ver: Percepción Humana vs. Medición Real



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030 7416 5320/5321

www.iwm.org.uk



Exterior line
Northbound platform 9



[REDACTED]

[REDACTED]

¿Qué crees que es?

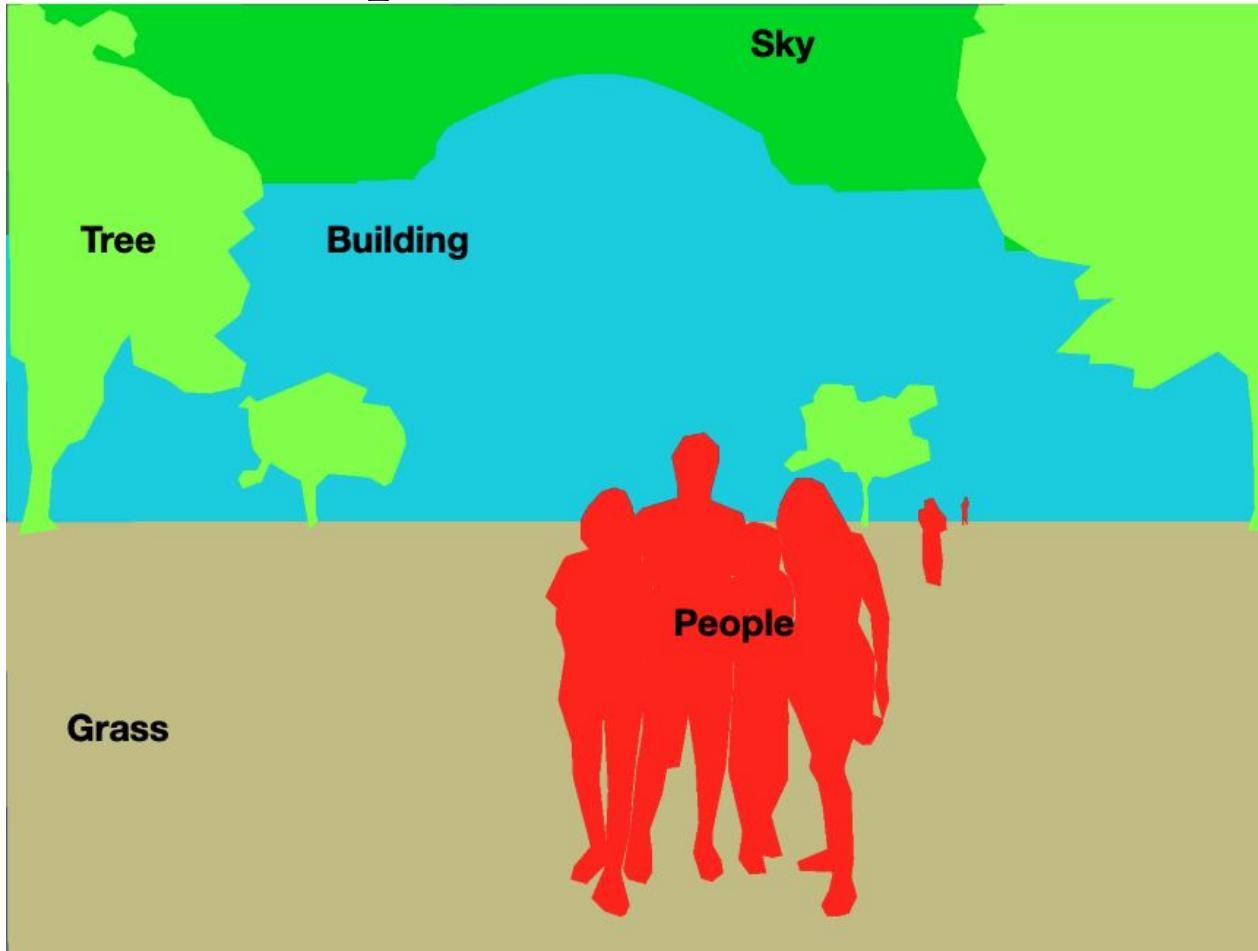




Qué “le importa” a los humanos?



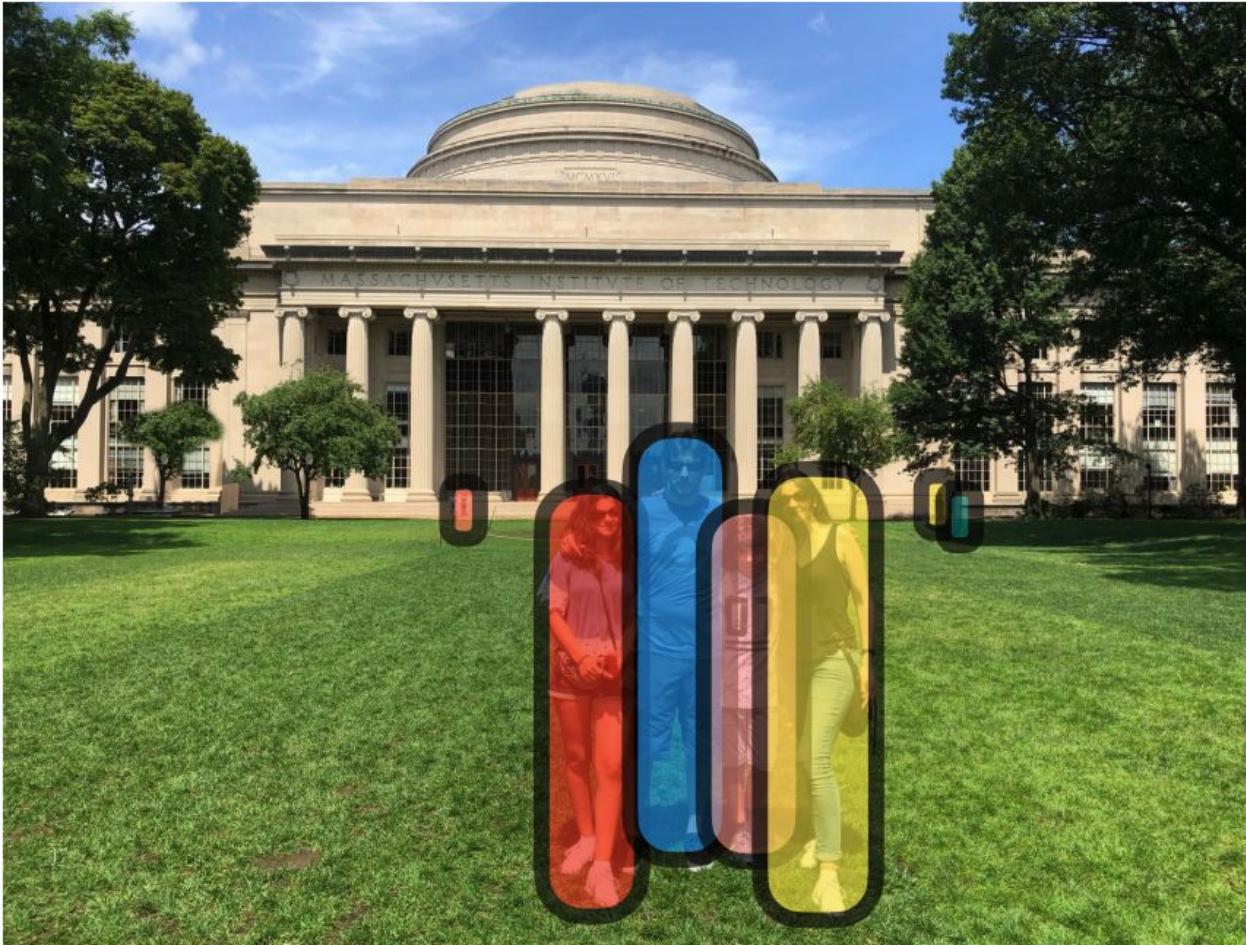
Qué “le importa” a los humanos?



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

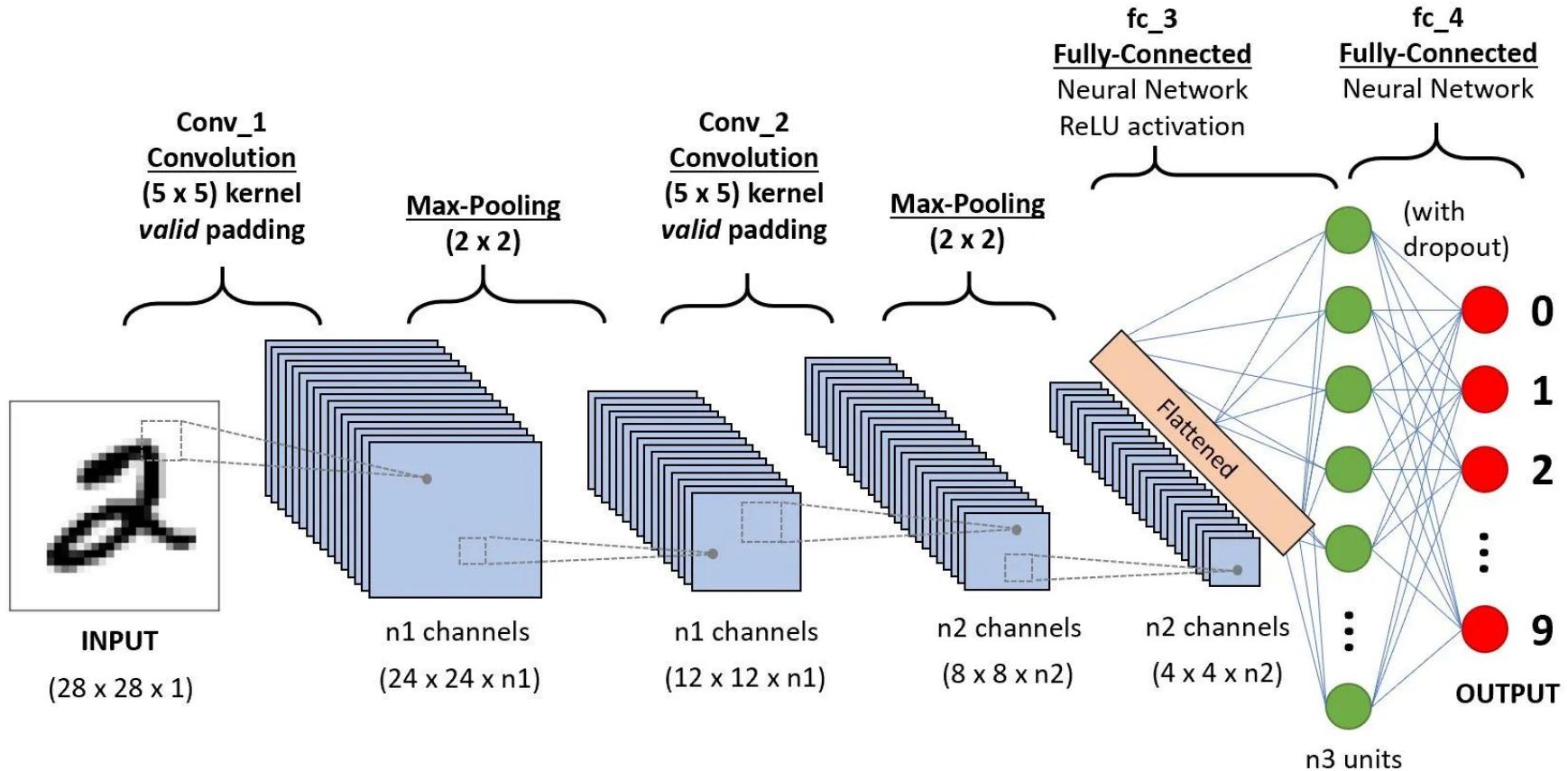
Qué “le importa” a los humanos?



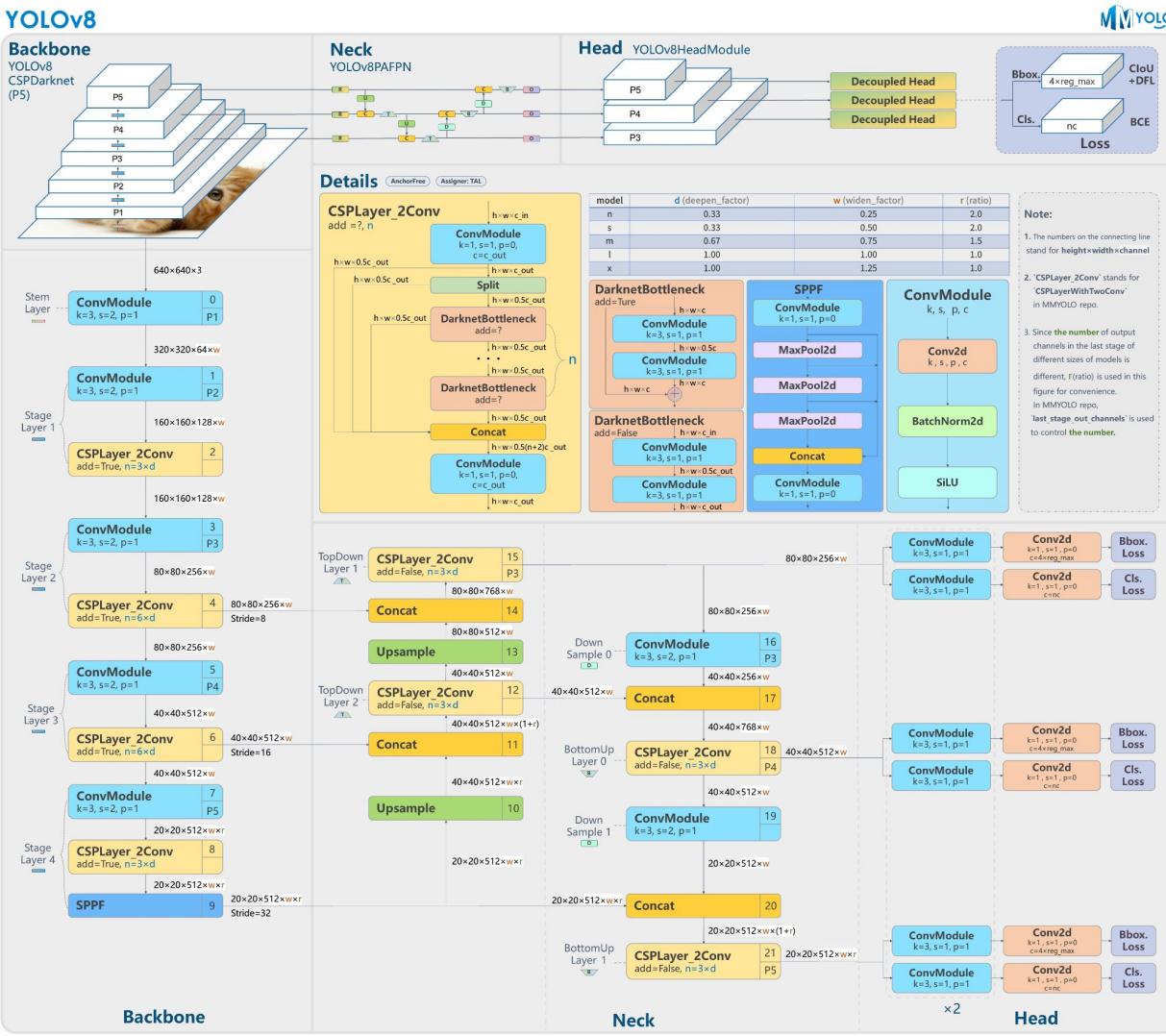
Recognition: who is this person?



Deep Learning “Al Rescate”

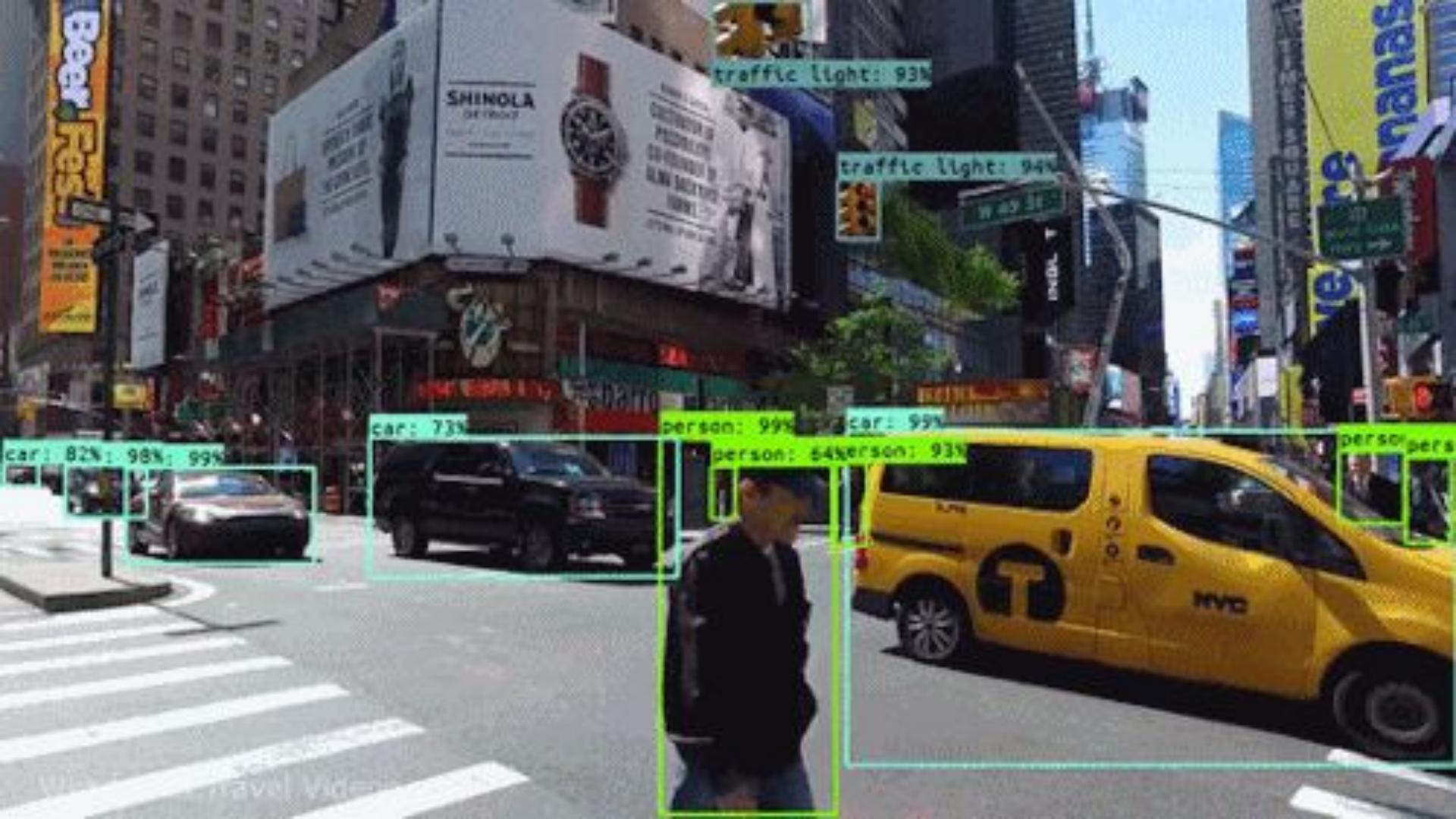


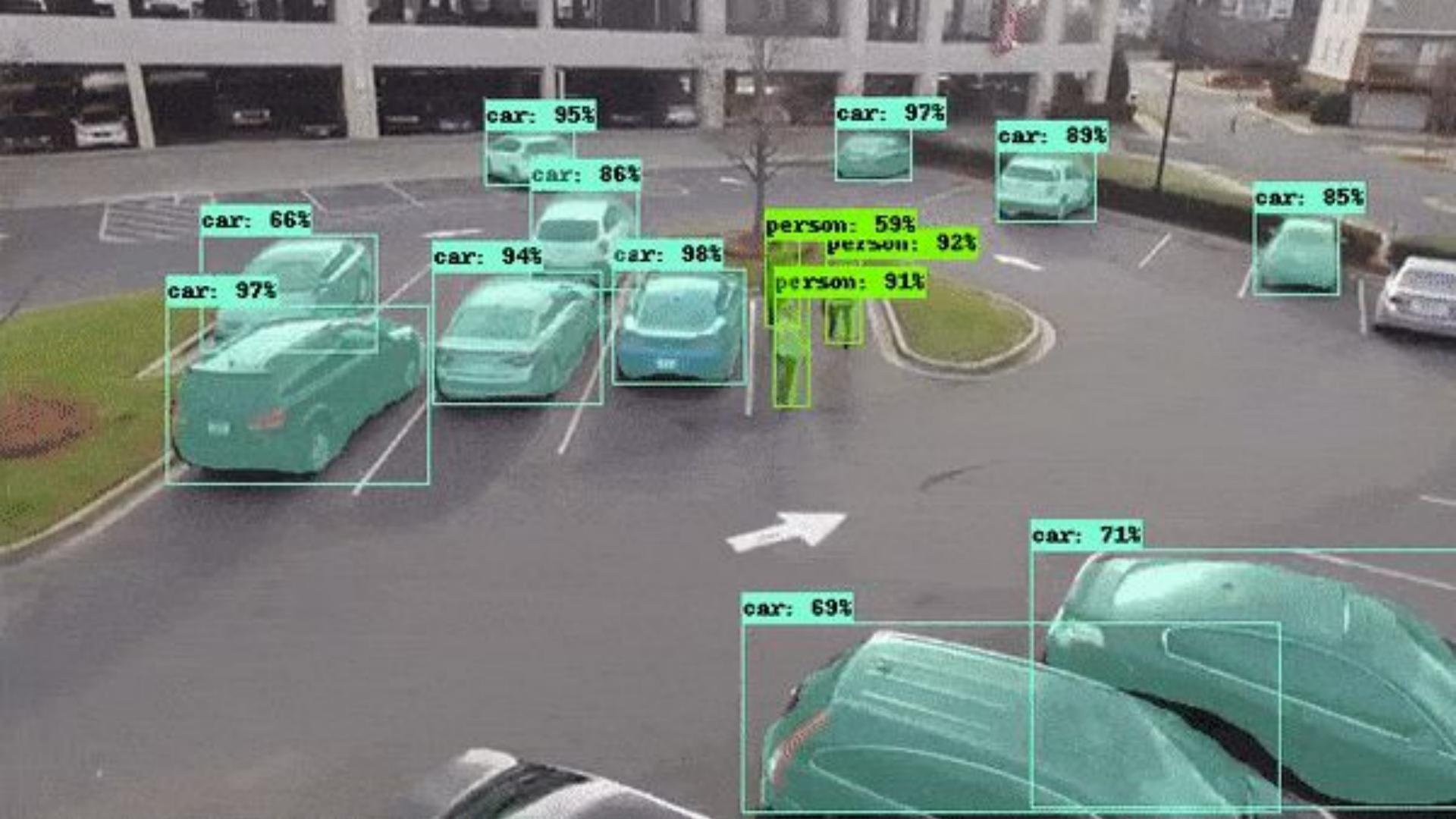
You Only Look Once

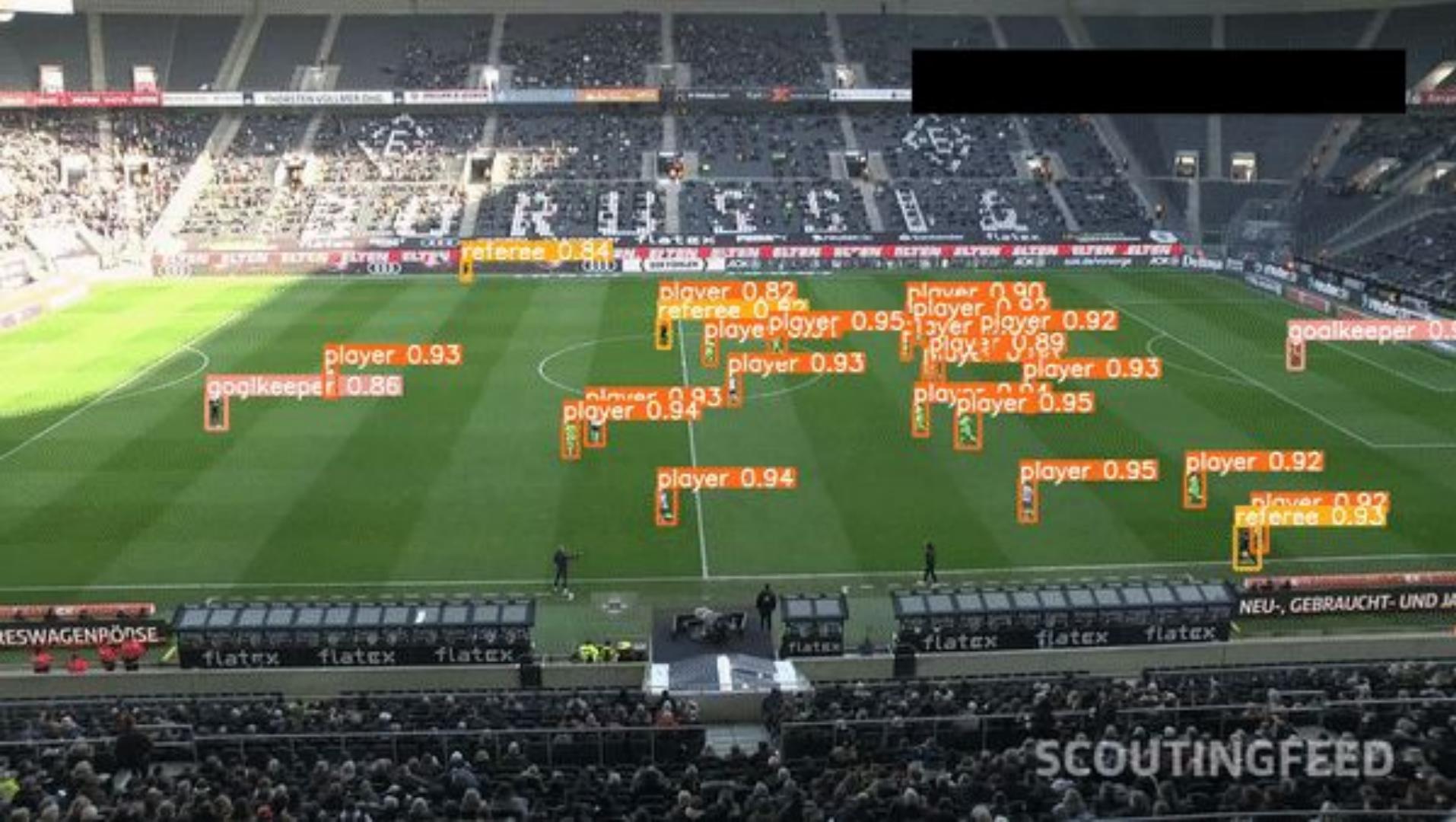


YOLO









referee 0.84

player 0.82

referee 0.82

player 0.95

player 0.92

player 0.89

player 0.93

player 0.97

player 0.93

player 0.92

player 0.89

player 0.93

player 0.94

player 0.95

player 0.95

player 0.93

player 0.93

player 0.95

player 0.92

player 0.93

referee 0.93

player 0.93

goalkeeper 0.85

player 0.93

player 0.94

player 0.95

player 0.94

player 0.95

player 0.92

player 0.93

referee 0.93

goalkeeper 0.93

referee 0.93

player 0.93

player 0.93

player 0.93

player 0.93

player 0.93

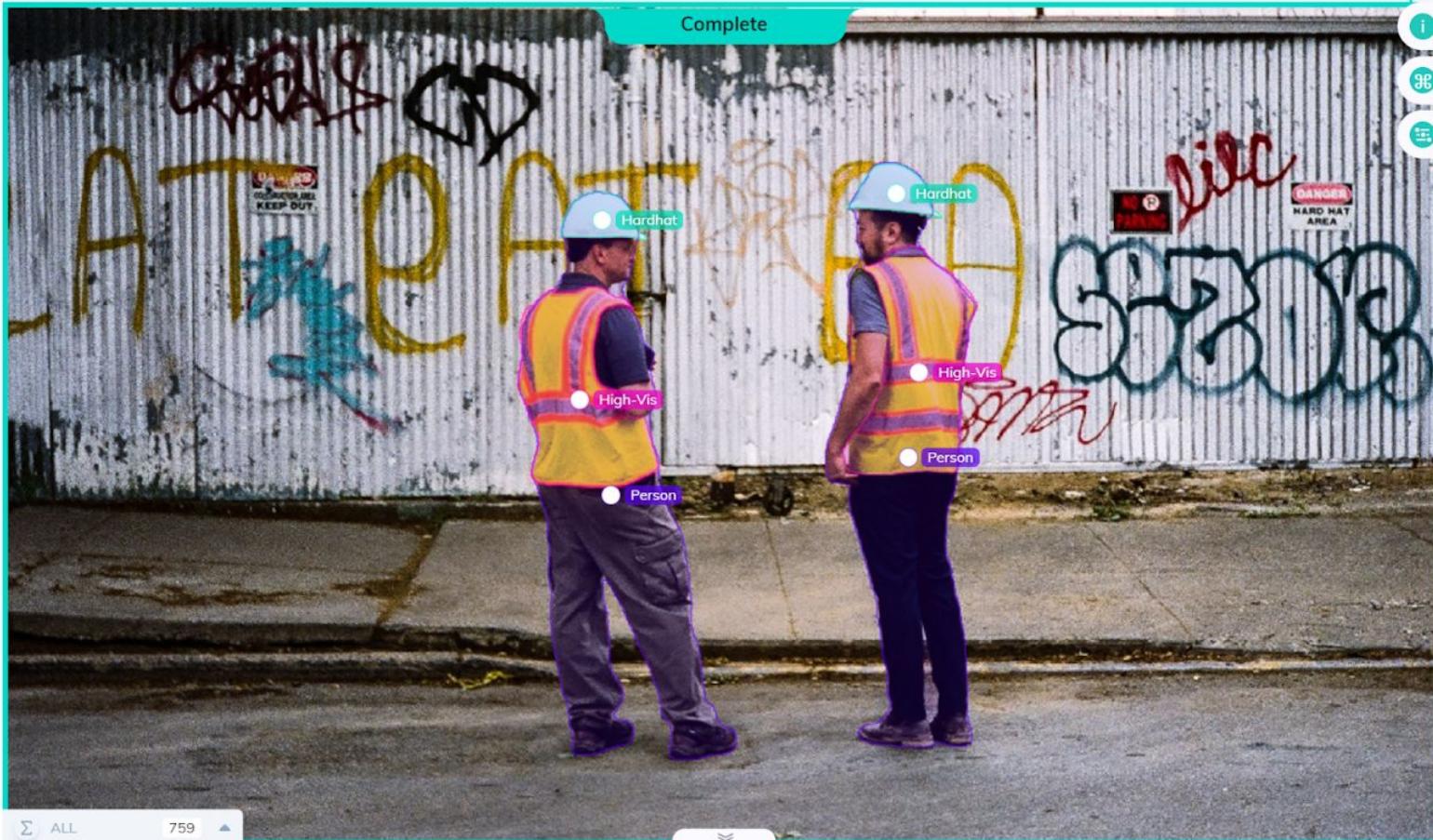
player 0.93

referee 0.93

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

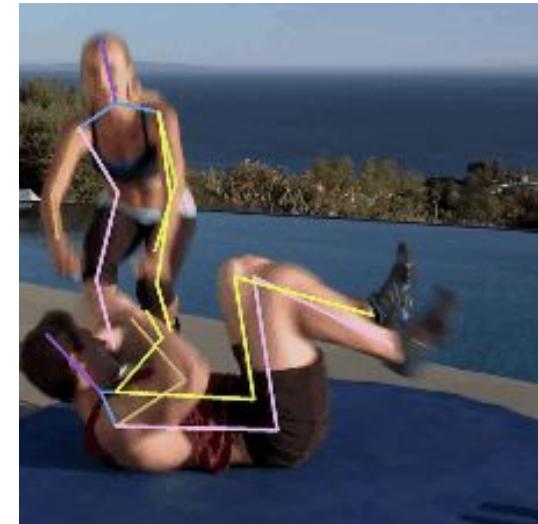
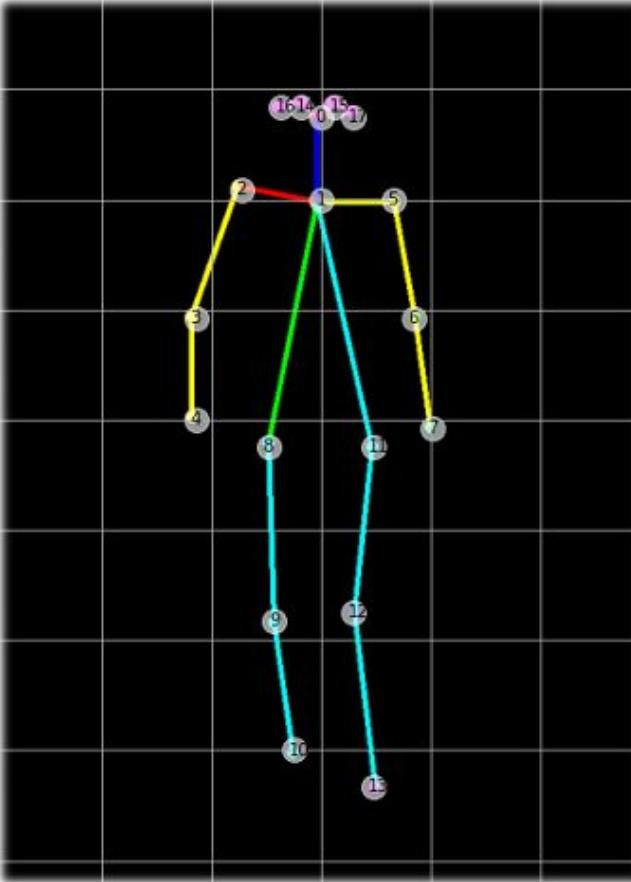
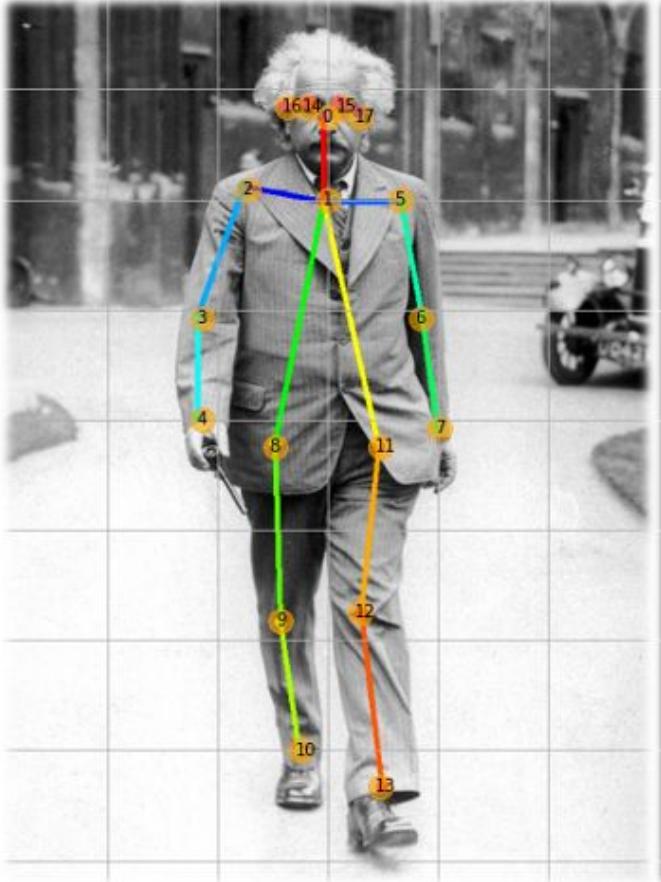


62%



Create Tag

Estimación de Pose





0 km/h

0 km/h

0 km/h

0 km/h 0 km/h

0 km/h

0 km/h

0 km/h

9

8

7

6

5

4

3

2

1



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



emotions

- angry
- disgusted
- fearful
- happy
- sad
- surprised
- natural

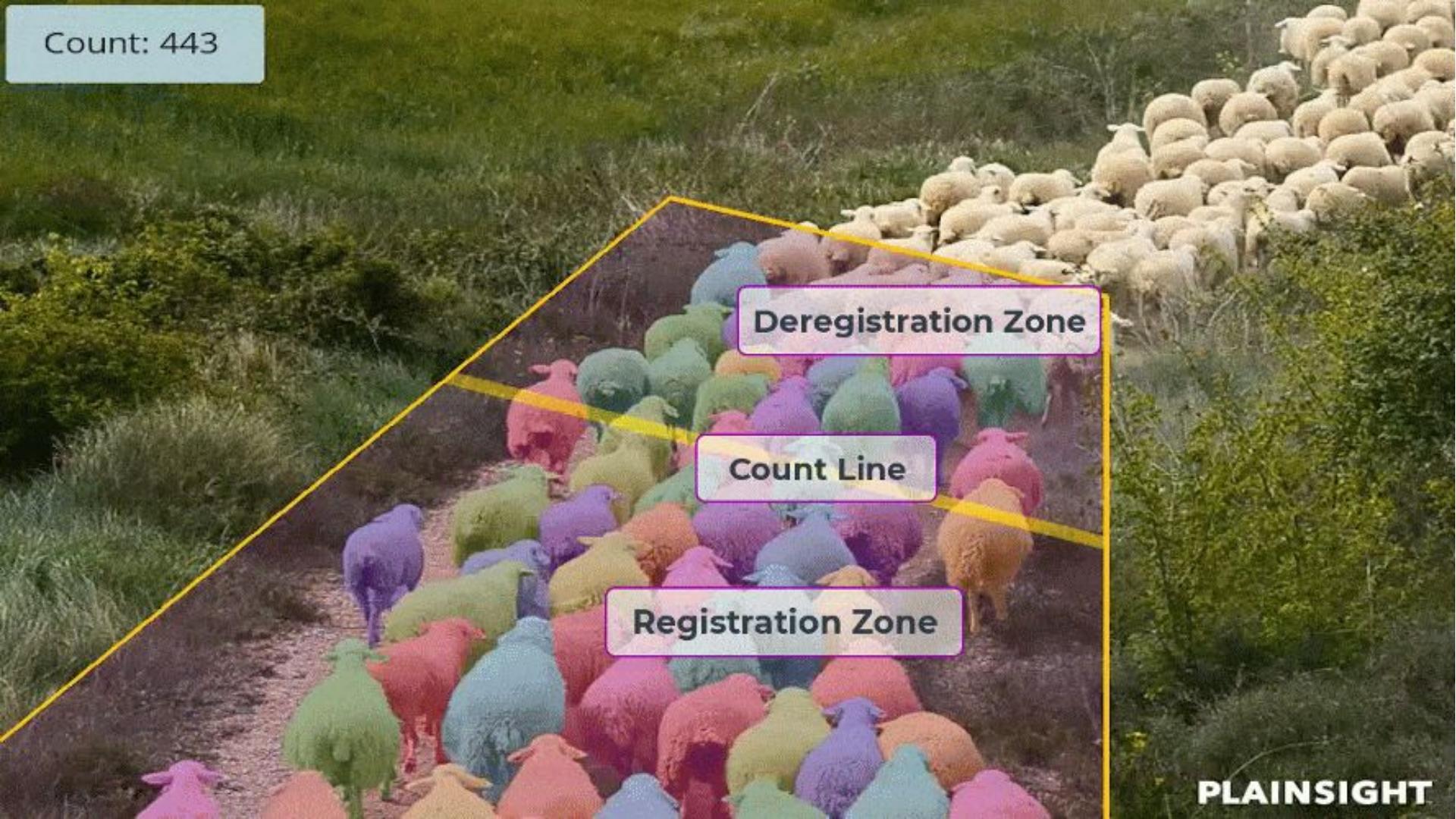


person id : 1
age : 30 - 35
gender : female
dwell time : 3.7 sec

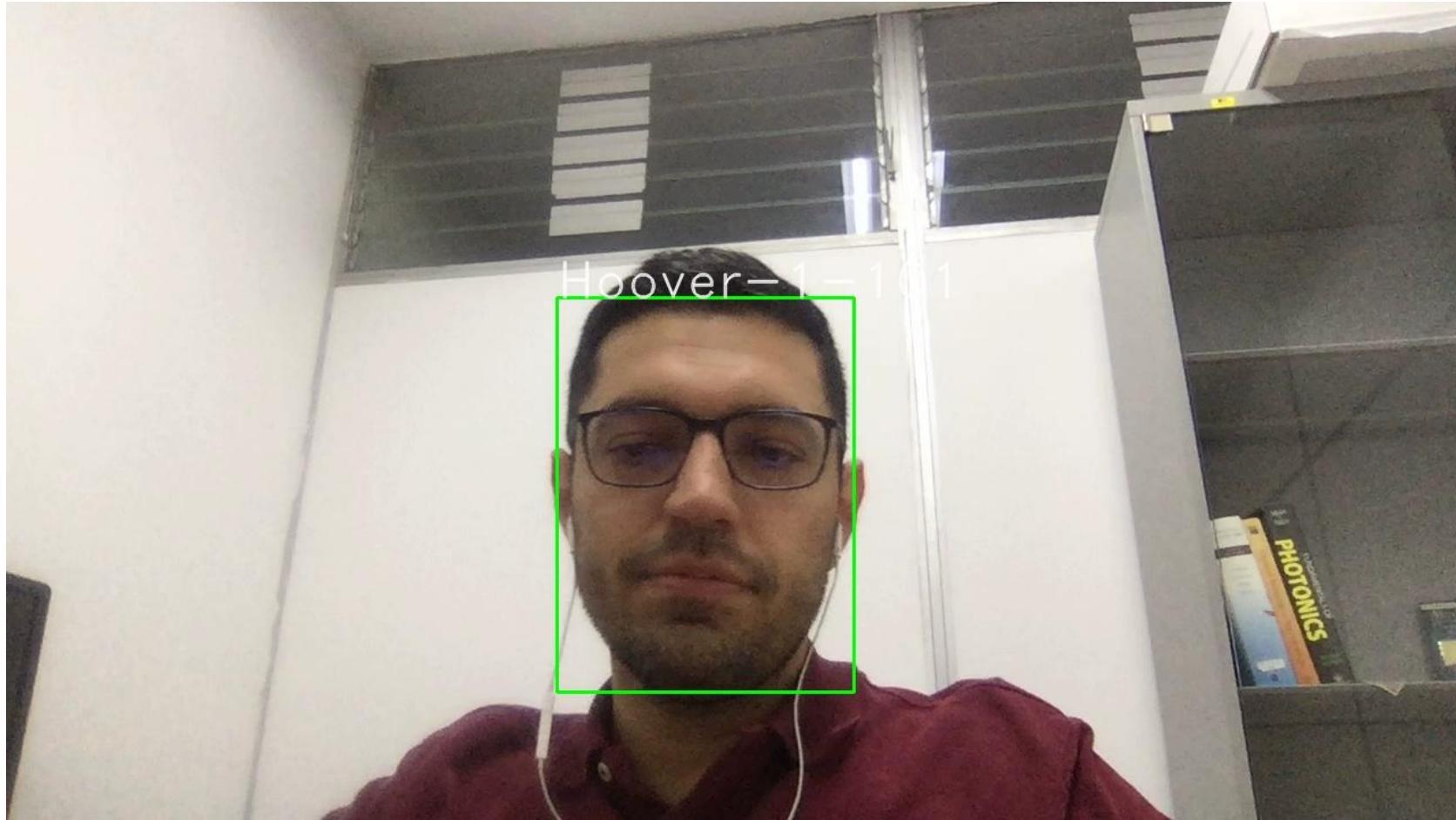
emotions

- angry
- disgusted
- fearful
- happy
- sad
- surprised
- natural

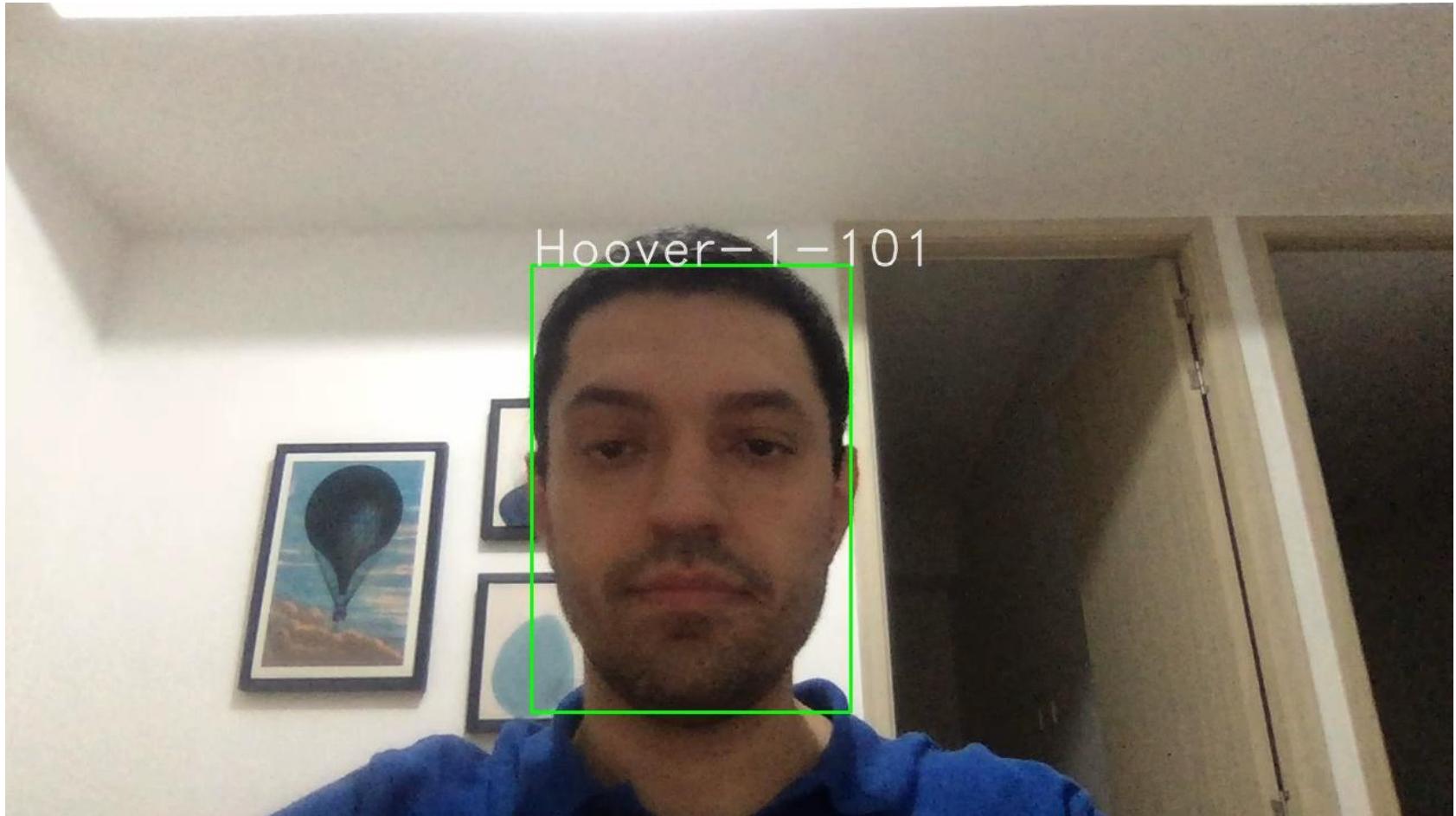
Count: 443



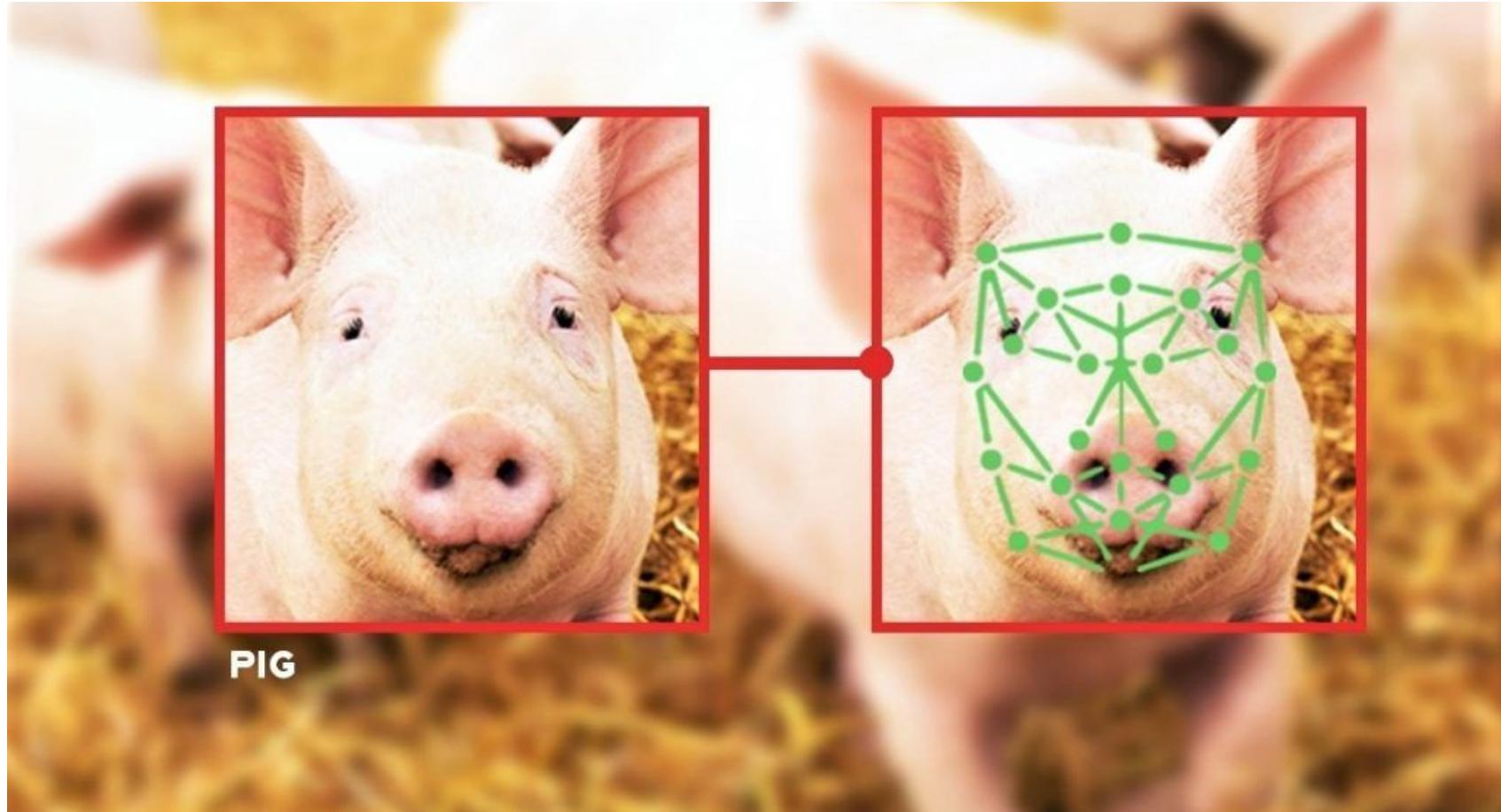
Reconocimiento facial



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 (8×4).



Sure! Here's the content of each cell in the 8×4 grid format:



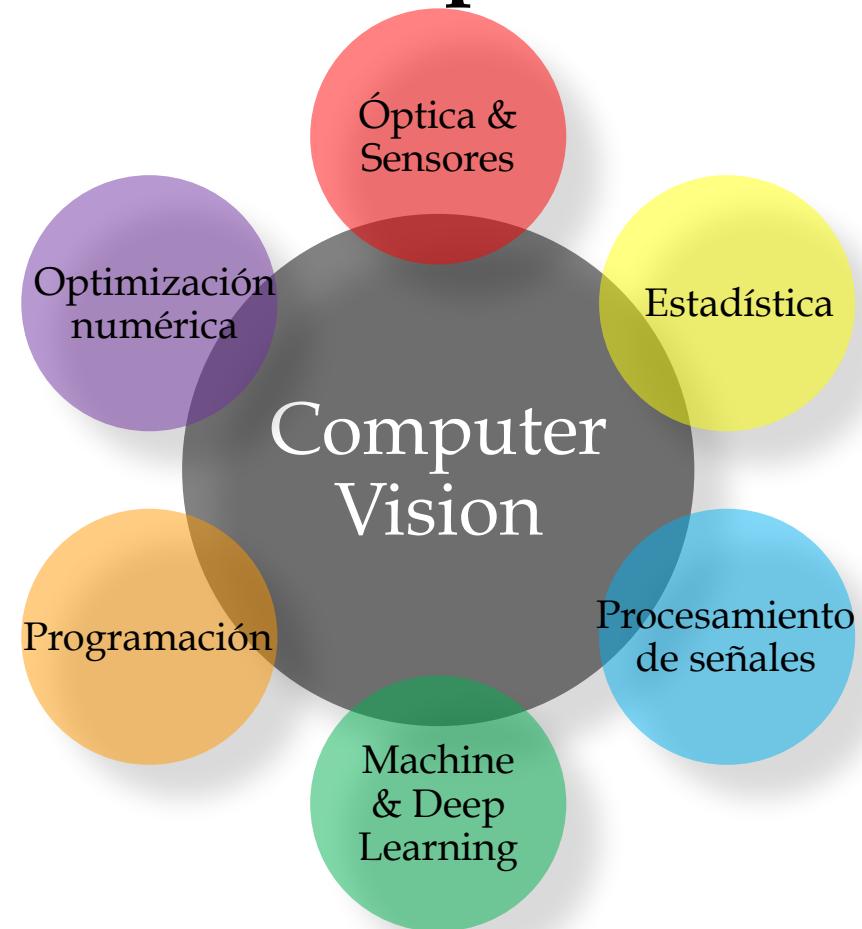
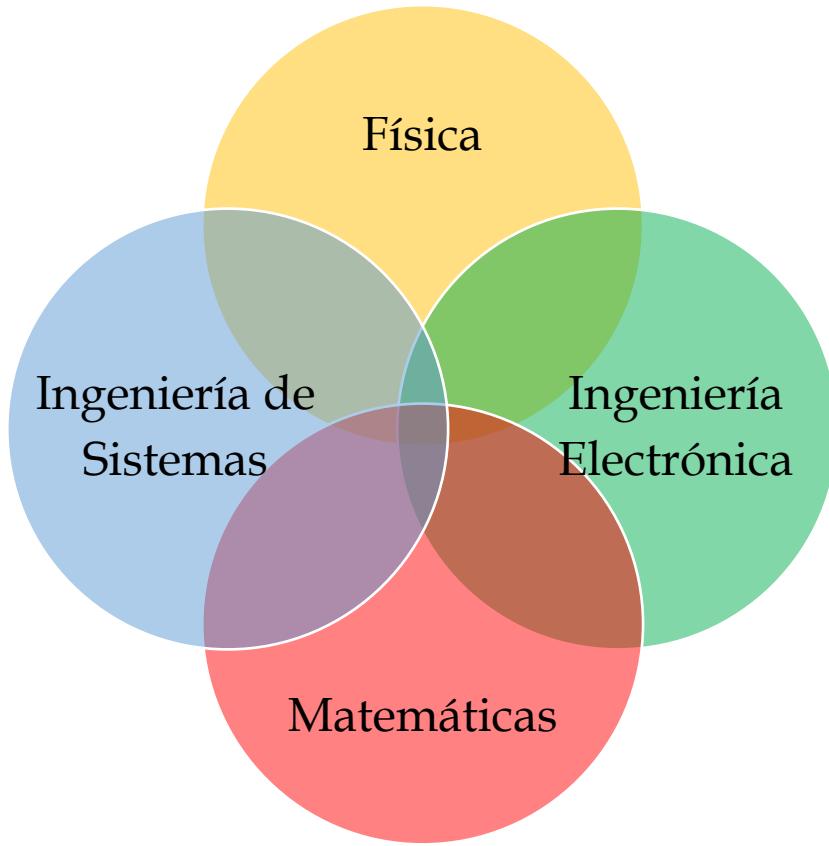
Muffin ✓	Dog ✓	Dog ✗	Muffin ✗	Muffin ✗	Dog ✗	Muffin ✗	Dog ✗
Dog ✓	Muffin ✓	Dog ✓	Muffin ✓	Dog ✗	Dog ✓	Muffin ✓	Muffin ✗
Dog ✗	Muffin ✗	Dog ✗	Dog ✓	Muffin ✗	Dog ✗	Dog ✓	Dog ✗
Dog ✓	Muffin ✓	Dog ✓	Dog ✗	Dog ✗	Muffin ✗	Dog ✗	Dog ✓

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

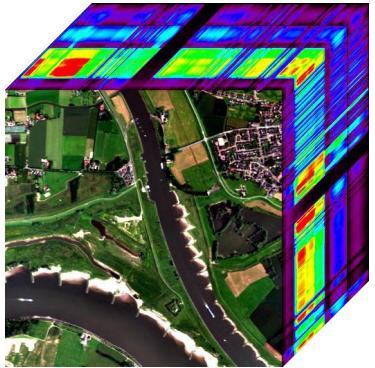
CV is still an open problem



CV = Área de acción interdisciplinar



Áreas de Investigación



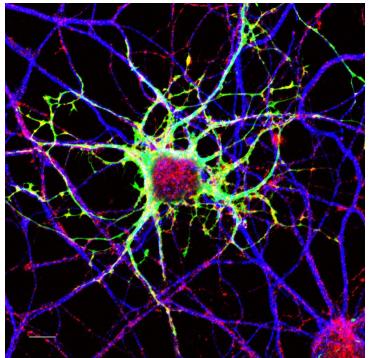
Hyperspectral imaging



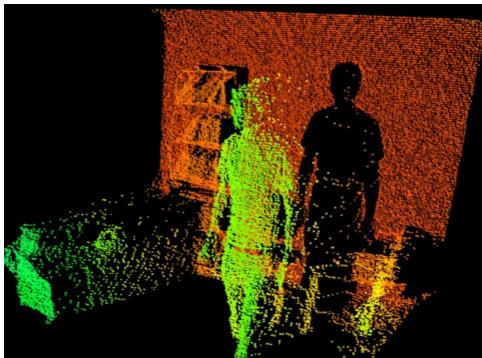
Depth imaging



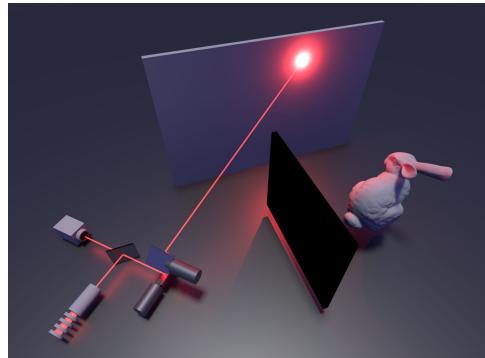
Infrared / Thermal Imaging



Microscopy



Single-photon imaging



Non-light-of-sight imaging



Hoover Rueda-Chacón

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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
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Higher-order computational model for coded aperture spectral imaging 150 2013

H Arguello, H Rueda, Y Wu, DW Prather, GR Arce
Applied Optics 52 (10), D12-D21

Compressive hyperspectral imaging via approximate message passing 88 2016

J Tan, Y Ma, H Rueda, D Baron, GR Arce
IEEE Journal of Selected Topics in Signal Processing 10 (2), 389-401

DMD-based implementation of patterned optical filter arrays for compressive spectral imaging 87 2015

H Rueda, H Arguello, GR Arce
JOSAA 32 (1), 80-89

Multi-spectral compressive snapshot imaging using RGB image sensors 52 2015

H Rueda, D Lau, GR Arce
Optics express 23 (9), 12207-12221

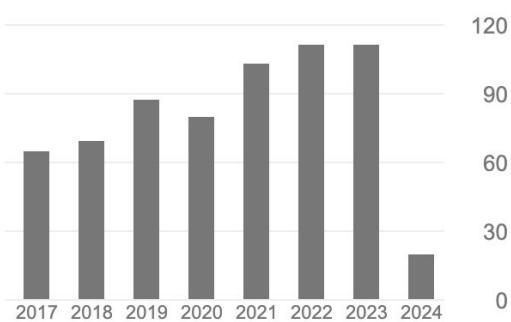
Classification of Hass avocado (*persea americana mill*) in terms of its ripening via hyperspectral images 32 2019

J Pinto, H Rueda-Chacón, H Arguello
TecnoLógicas 22 (45), 111-130

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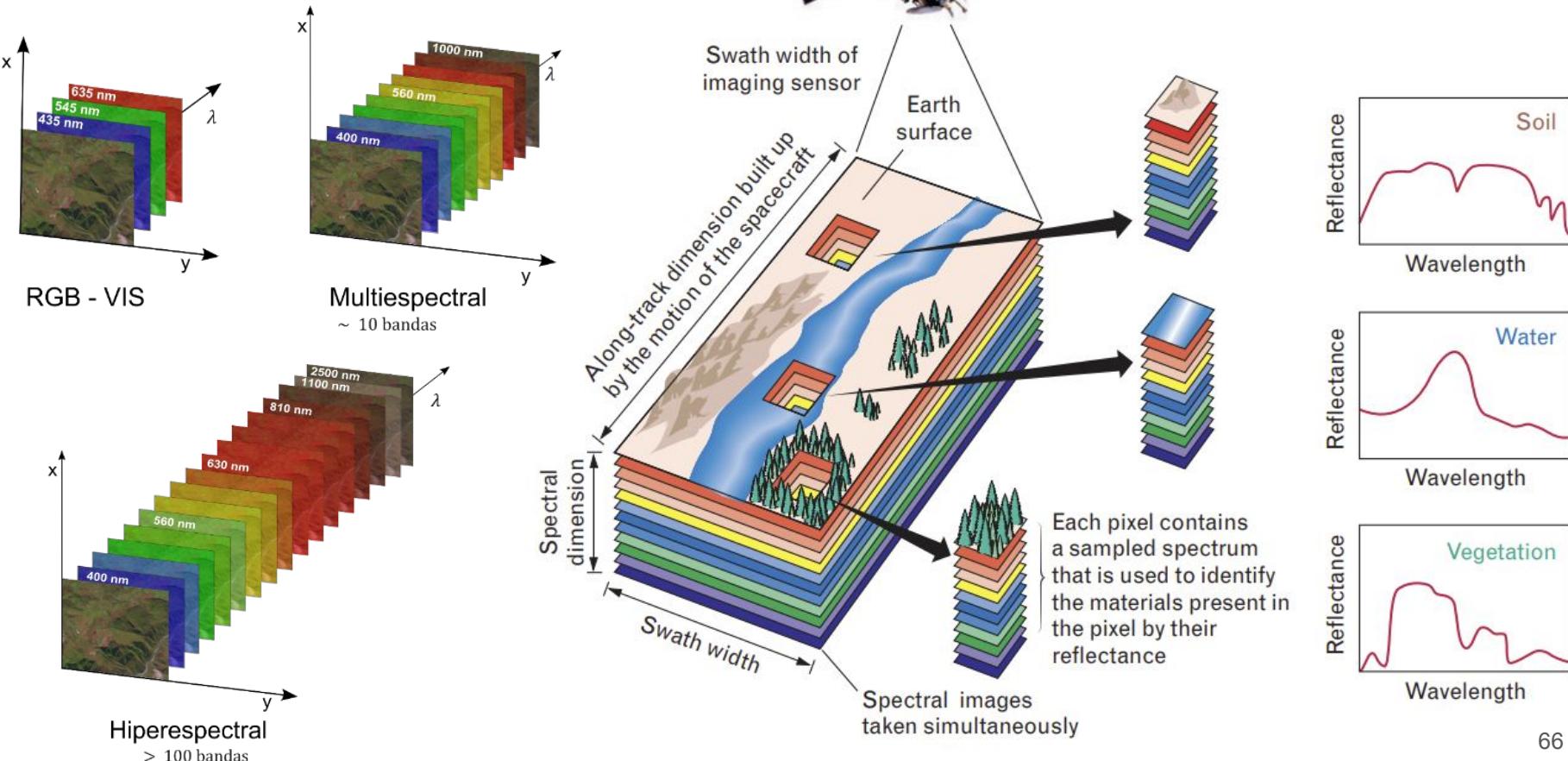
6 articles

not available

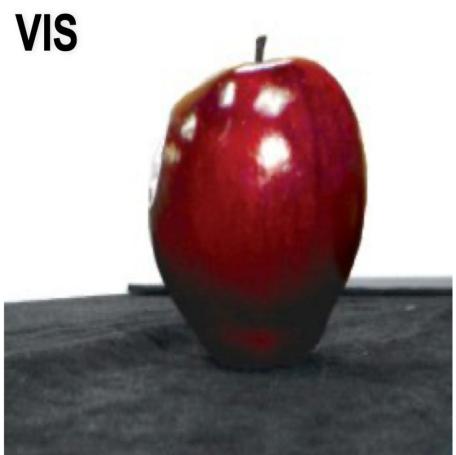
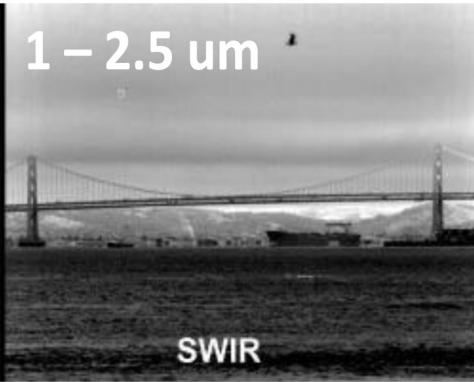
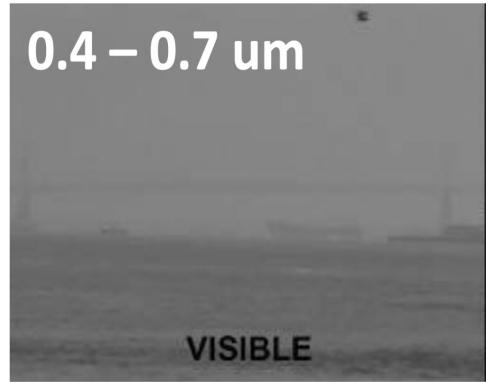
available

Based on funding mandates

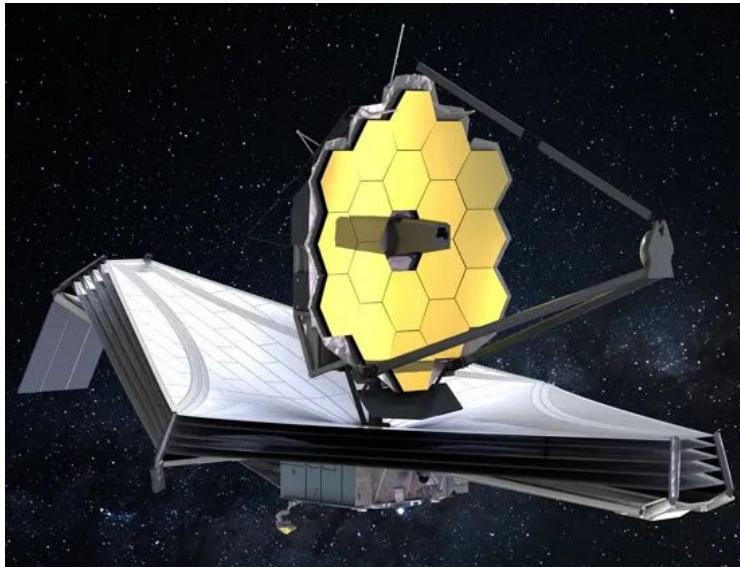
Imágenes espectrales (x, y, λ)



Imágenes espectrales (Aplicaciones)



Deep Space



James Webb Space Telescope
(10 USD billion camera)

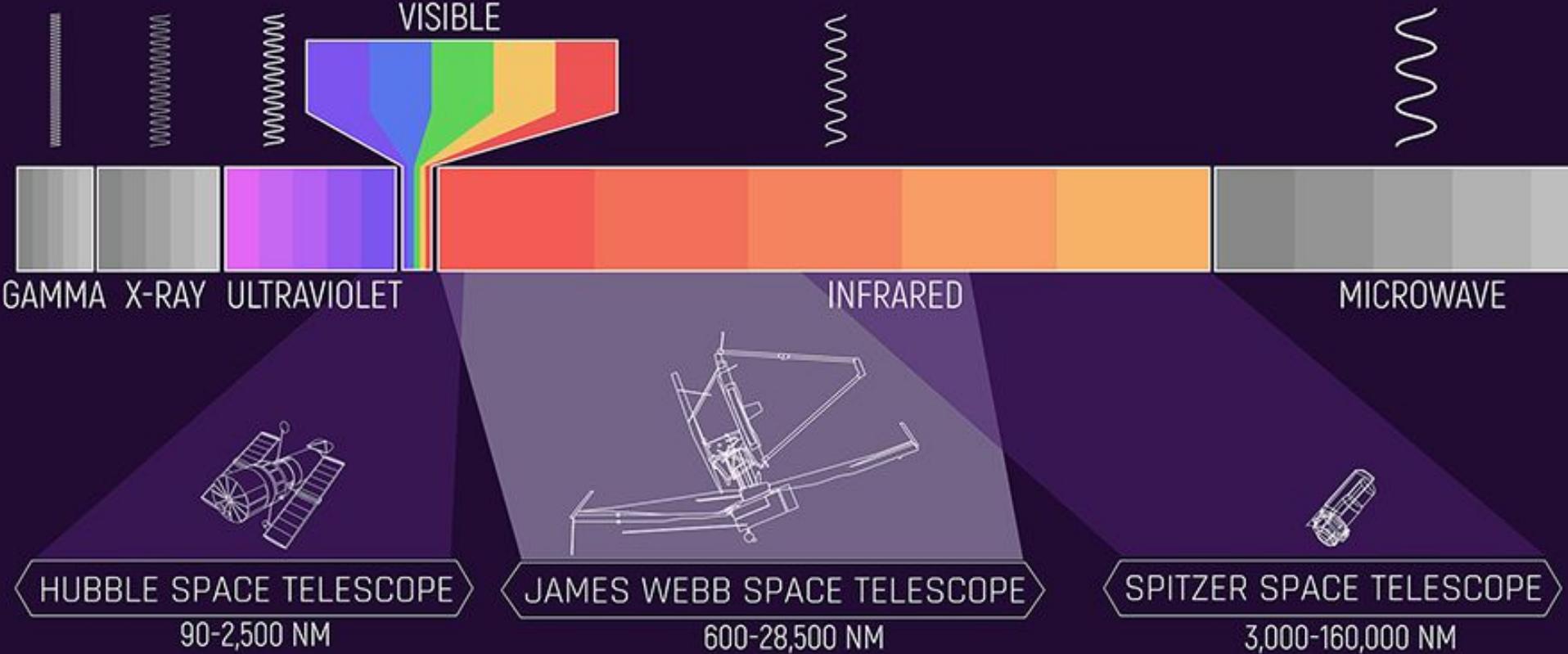


Hubble



JWST

Sensibilidad del JWST

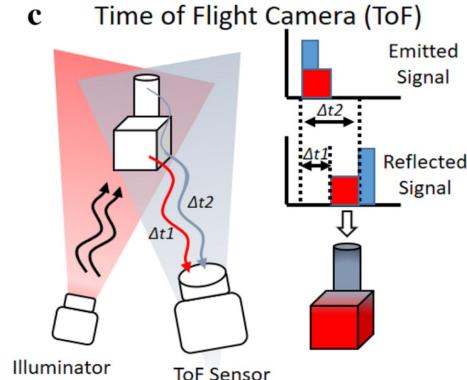
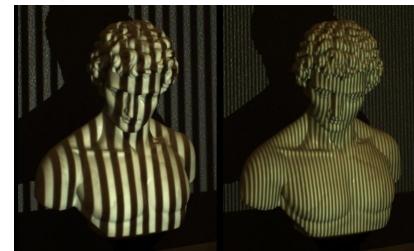
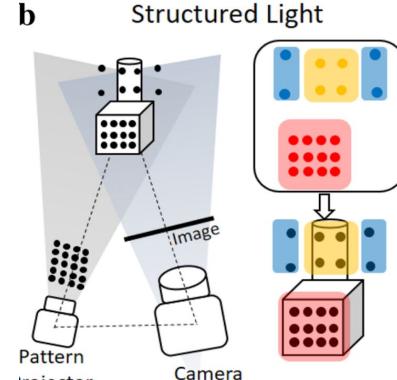
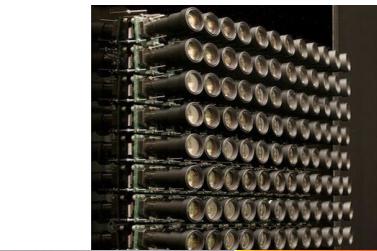
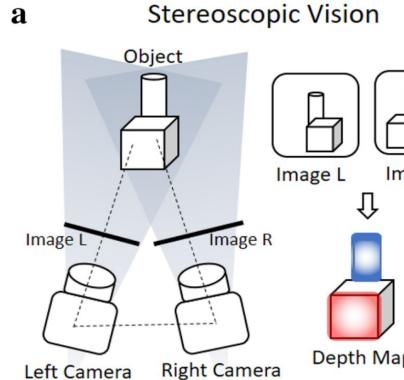


Imágenes de profundidad (x,y,z)



[cm]

Estimación de profundidad

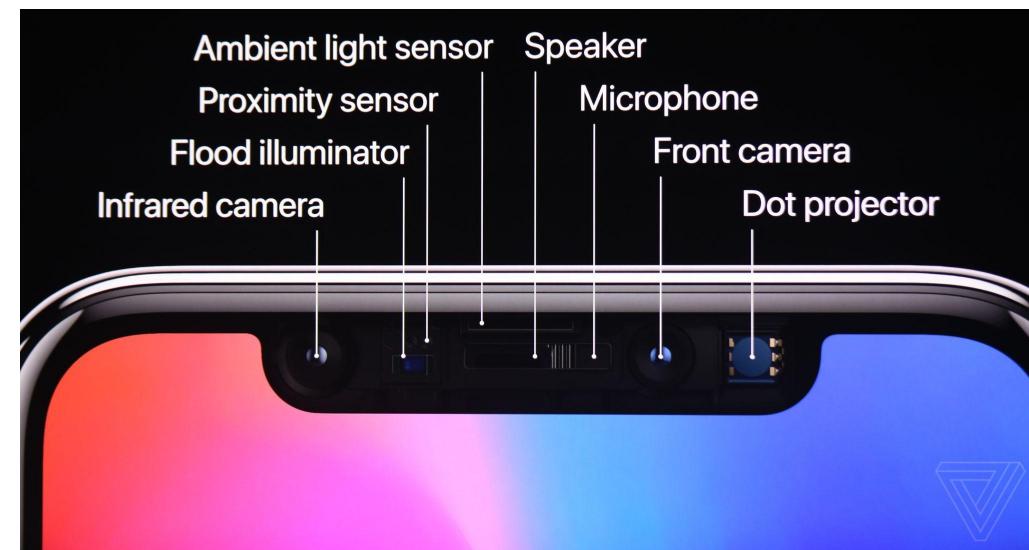




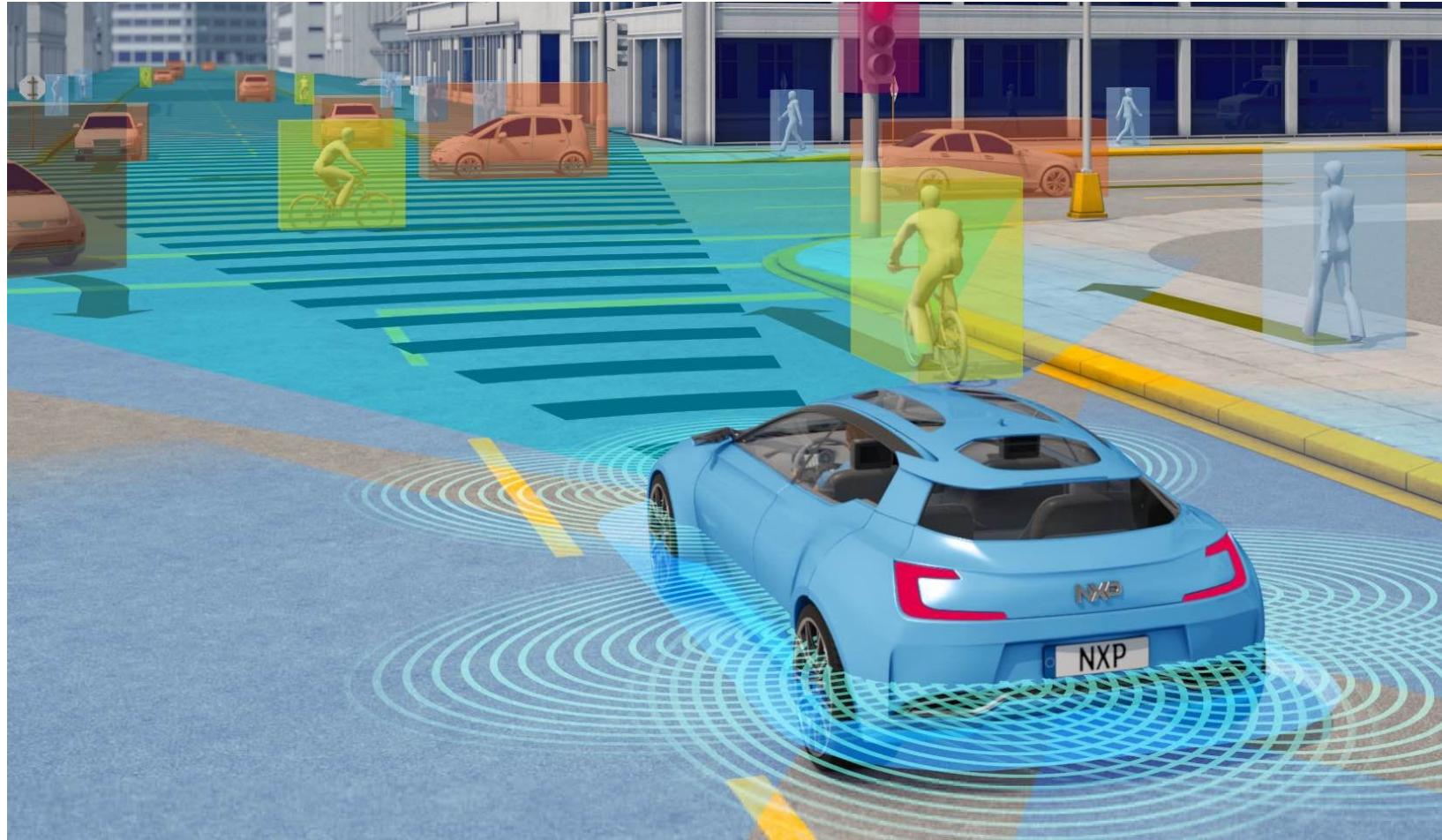
Input



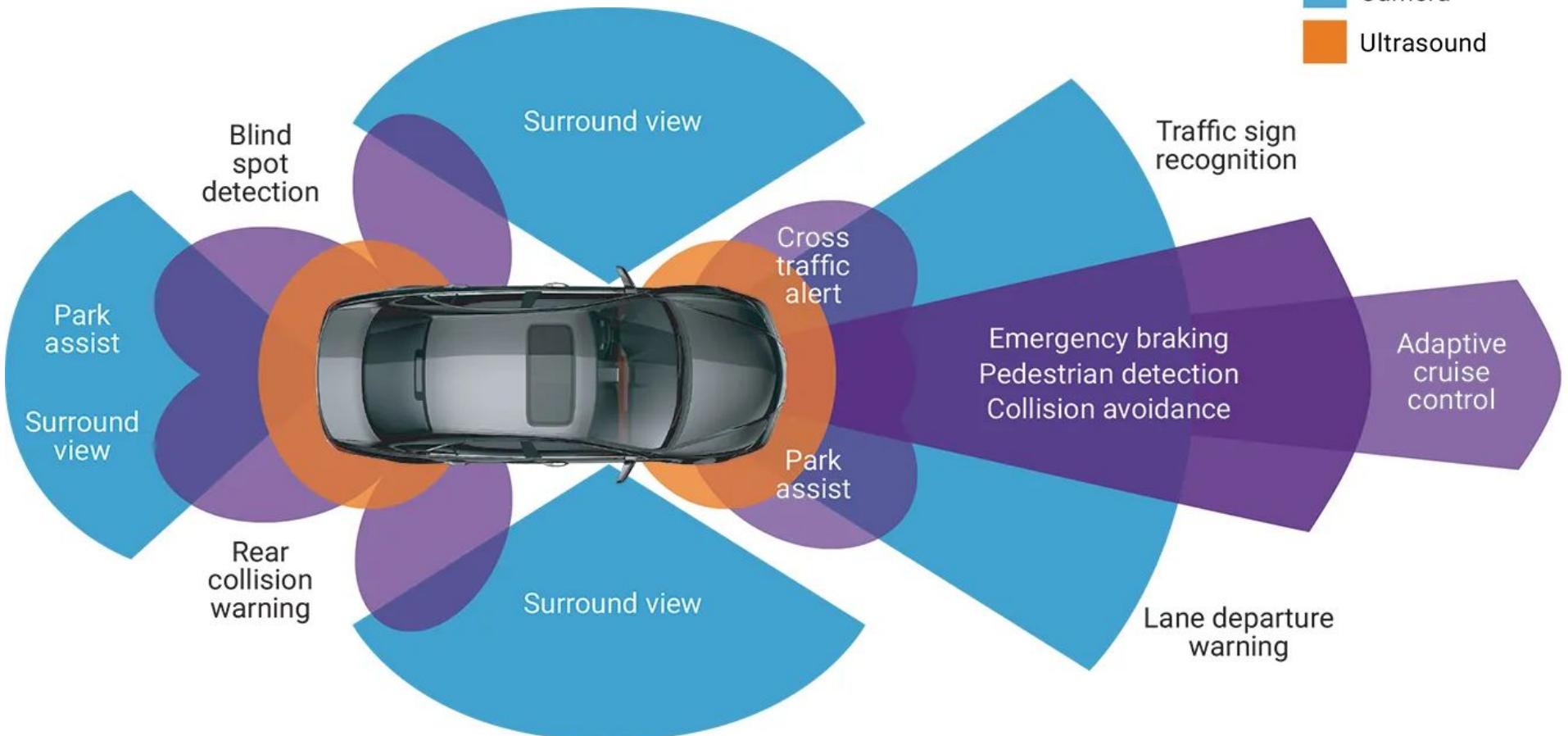
Our depth predictions*



Vehículos autónomos

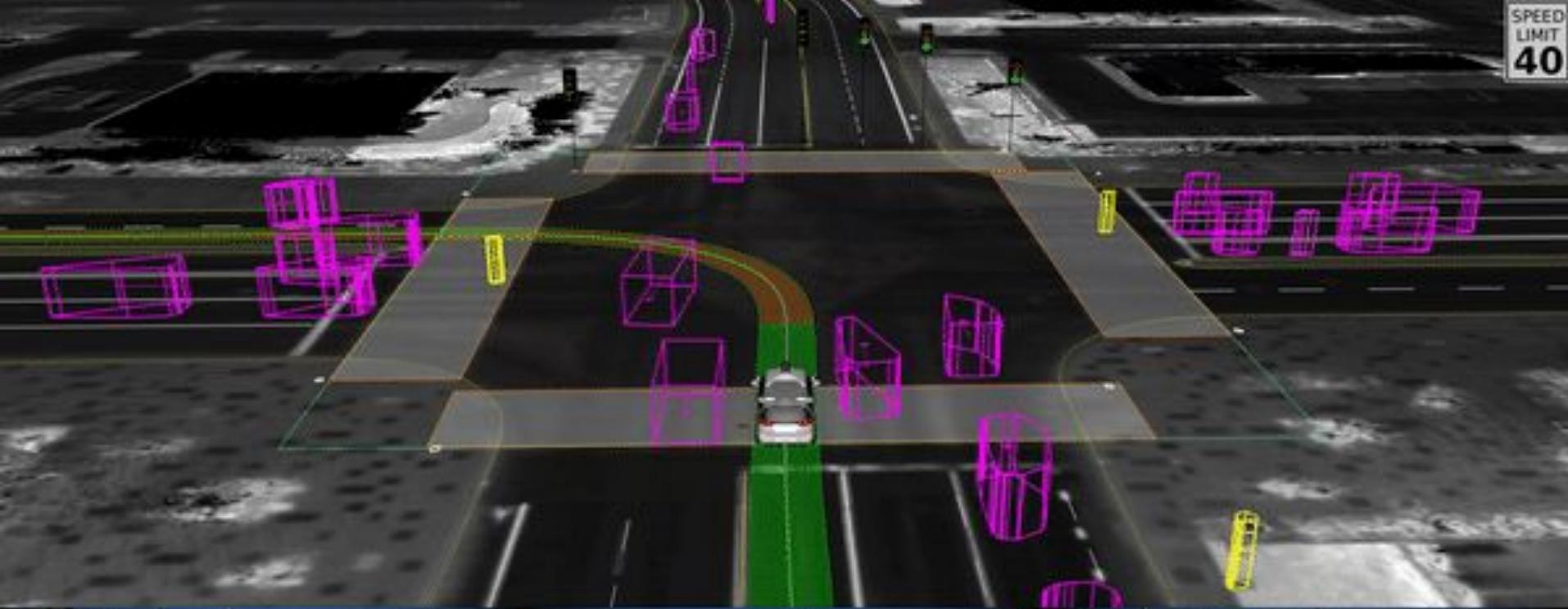


Vehículos autónomos (Sensores)

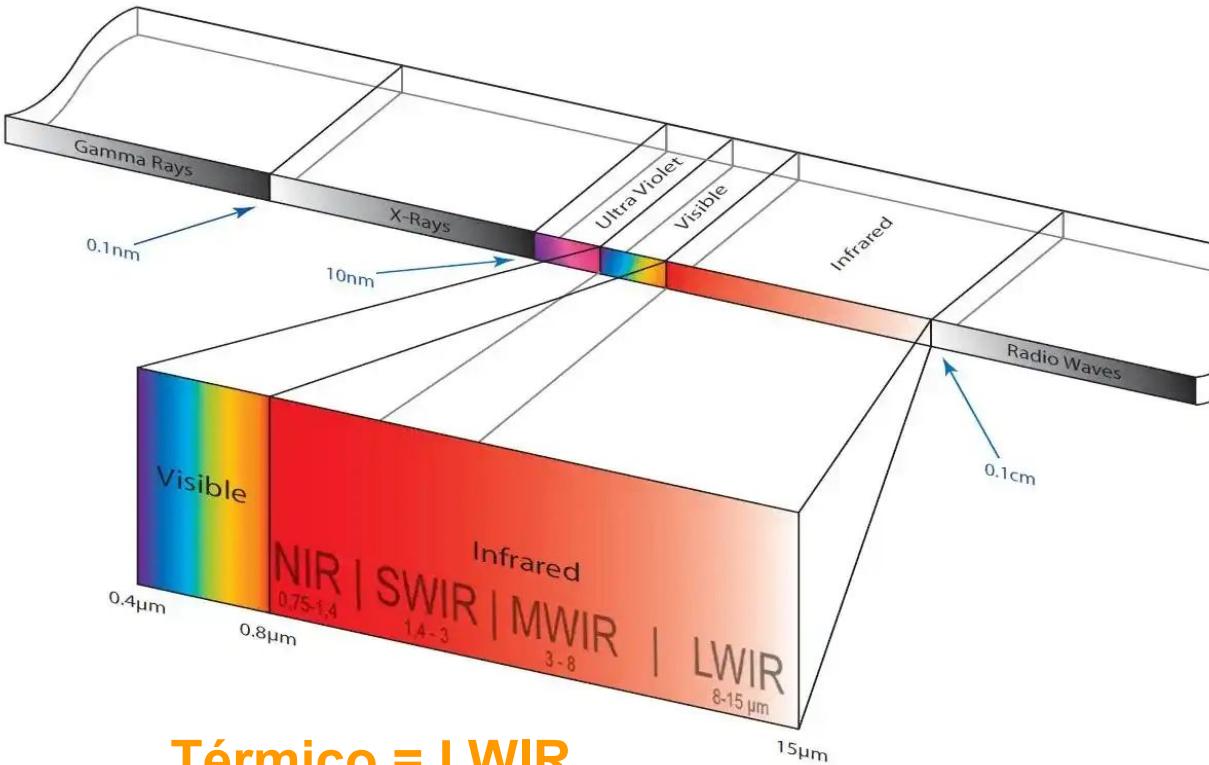


- Radar/LIDAR
- Camera
- Ultrasound

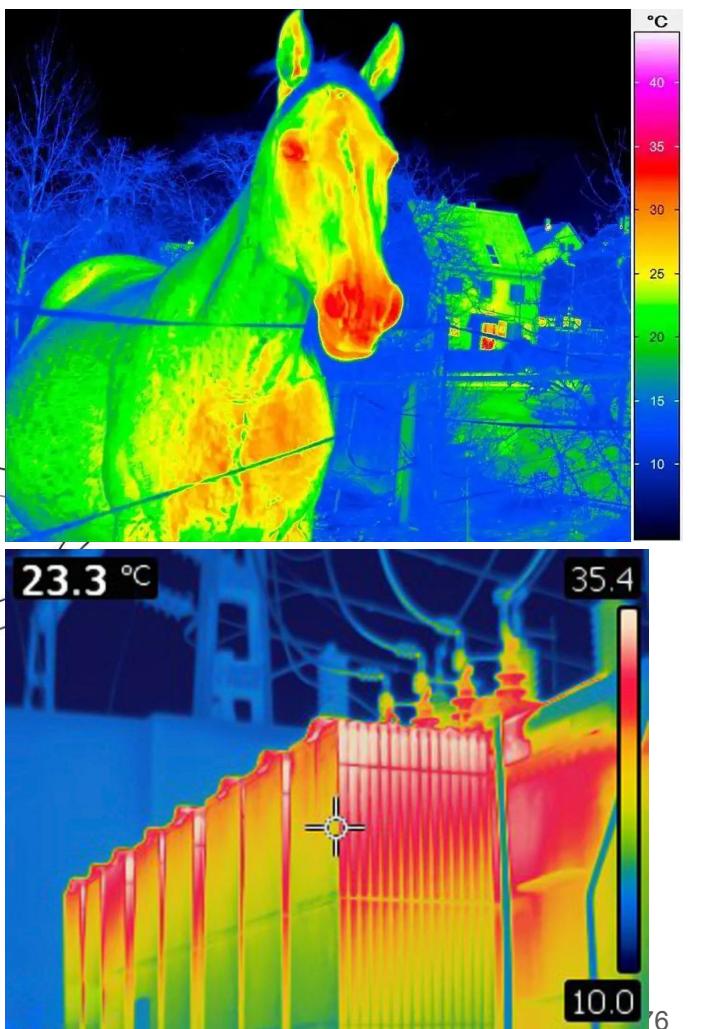
SPEED
LIMIT
40



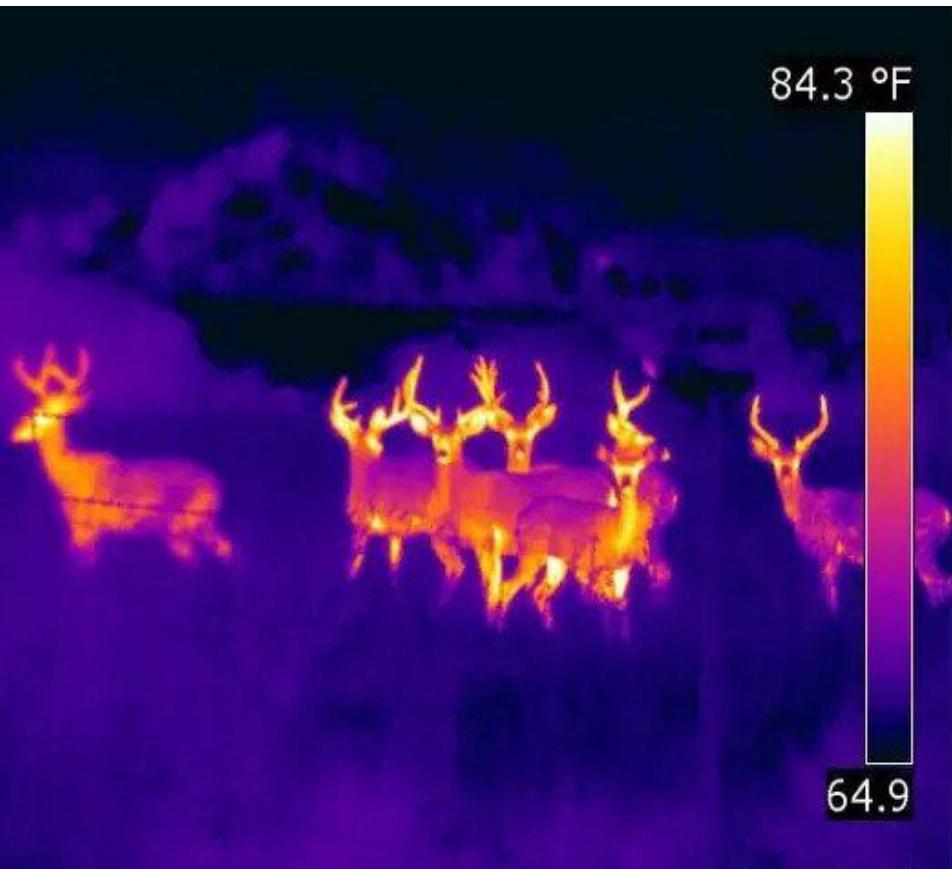
Imágenes térmicas



Térmico = LWIR



Imágenes térmicas





FLIR Pioneer



Demos

<https://semillerocv.github.io/galeria.html>

Galeria



Lucha



Miguel



Escritorio



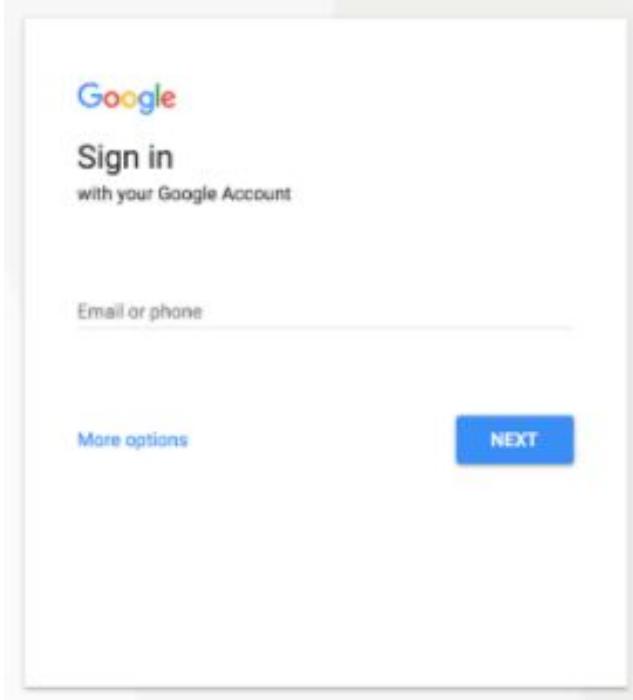
Deteccion de objetos



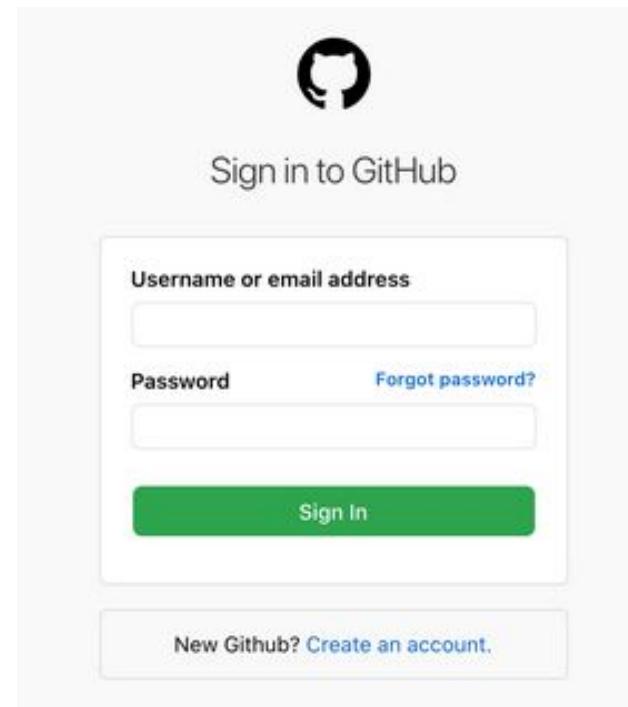
Estimacion de profundidad

Setting up the Hands-On Experience

Inicia sesión en Google



Inicia sesión en GitHub



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

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

semillero computer vision semillerocv.github.io/ computer-vision deep-learning cv courses hands-on

languages Jupyter Notebook 100.0%

README

Semillero "Hands-on Computer Vision"



Haz fork

Dale una estrella!

Screenshot of a GitHub repository page for "Hands-on-Computer-Vision". The repository is public and has 2 forks and 1 star. A red box highlights the "Fork" button in the top right corner.

The repository contains 1 branch and 0 tags. The main branch has 33 commits. Recent commits include:

- Factral added readme
- Sesiones added structure for sesion2
- .gitignore first naive configuration
- README.MD added readme
- logo.png added readme

The README file content is:

Semillero "Hands-on Computer Vision"



The repository has the following statistics:

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

Report repository

Languages

Jupyter Notebook 100.0%

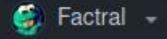
Haz fork

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 *



Factual

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

Screenshot of a GitHub repository interface showing the 'Files' tab for the 'Exercise1.ipynb' file in the 'Sesion1' folder.

The 'Exercise1.ipynb' file is highlighted with a red box.

File tree (left):

- main
- + Go to file
- Sesiones
 - Sesion1
 - images
 - Exercise1.ipynb
 - README.md
 - Sesion2
 - Sesion3
 - Sesion4
 - Sesion5
 - Sesion6
 - Sesion7
 - Sesion8
 - Sesion9
- main.ipynb

File details (right):

Hands-on-Computer-Vision / Sesiones / Sesion1 / Exercise1.ipynb

Factral added exercise1 · be43f27 · 14 minutes ago · History

Preview | Code | Blame | 129 lines (129 loc) · 3.81 KB

Raw |  |  | 

Sesion 1: Pilot



Marzo 4, 2024 | 4 pm - 6 pm
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>

Ejecuta el notebook en colab

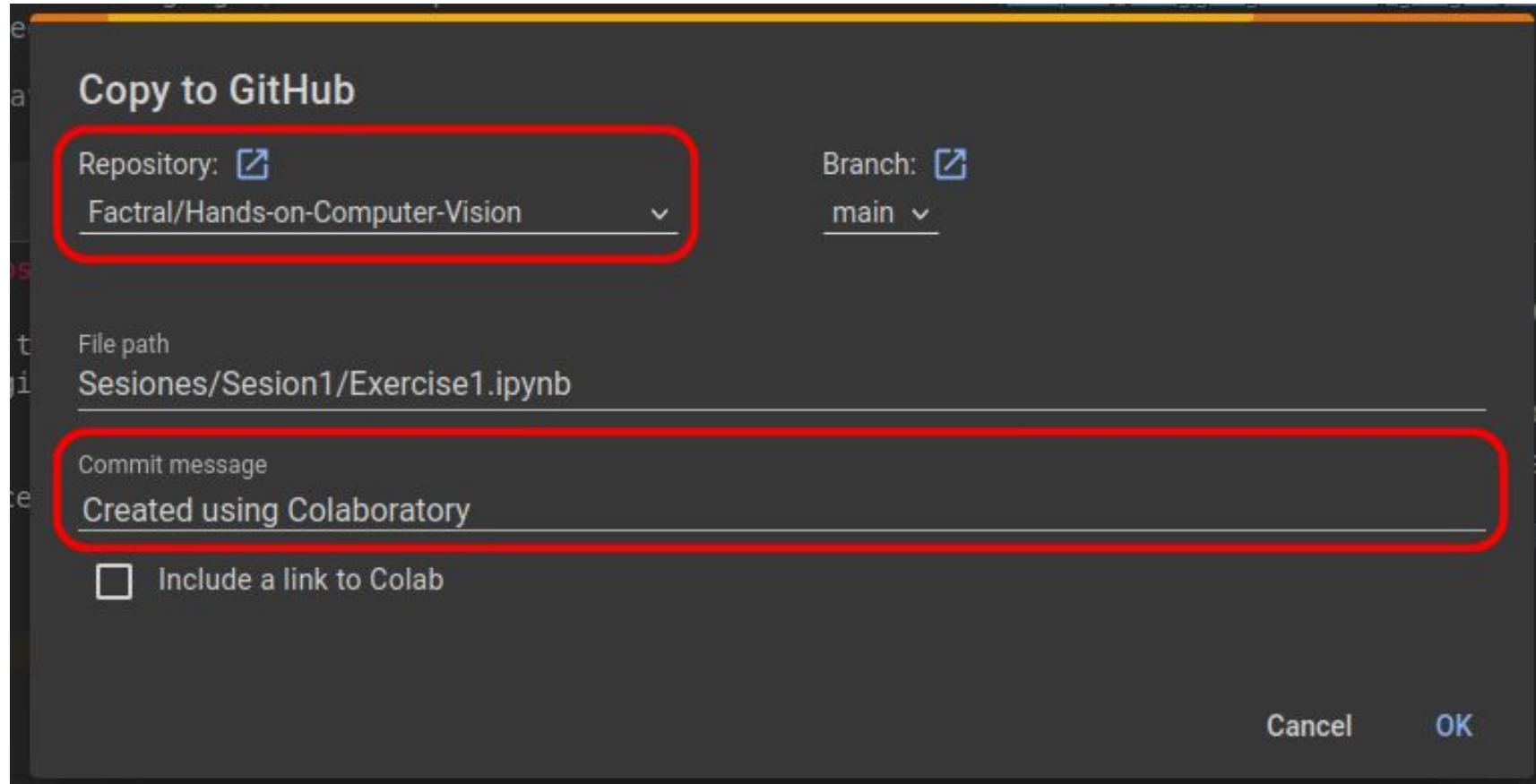
The screenshot shows a Google Colab interface with the following details:

- Title Bar:** Exercise1.ipynb, File, Edit, View, Insert, Runtime, Tools, Help, Cannot save changes.
- Toolbar:** Share, Settings, Full Screen.
- Left Sidebar:** Icons for Code, Text, Copy to Drive, Search, and a folder labeled {x}.
- Content Area:** A slide titled "Sesion 1: Pilot". The slide features a green header with "Hands-on Computer Vision" and a circular logo. The main title "SESIÓN 1: PILOT" is displayed in large white letters on a blue background with circuit board patterns. At the bottom, it says "Marzo 4, 2024 | 4 pm - 6 pm CENTIC Sala 1-2".
- Bottom Status Bar:** RAM (green checkmark), Disk (green checkmark), Colab AI, and a refresh icon.

IMPORTANT si realizas cambios en este notebook en colab es necesario que hagas commit antes de cerrar la pestaña, si no se perderan los cambios, porfavor, manten abierta la pestaña

OJO: Es importante que no cierres el colab mientras lo estas editando!

Guarda tus cambios!



Verifica el commit

The screenshot shows a GitHub repository page for 'Hands-on-Computer-Vision'. The repository is public and was forked from 'semilleroCV/Hands-on-Computer-Vision'. The page displays basic statistics: 1 branch, 0 tags, and 32 commits. A specific commit, 'ab29a60 · 14 minutes ago', is highlighted with a red box. The commit message is 'mi primer commit' and it was made by 'Factual'. Navigation and search tools are visible at the top.

Hands-on-Computer-Vision Public

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

ab29a60 · 14 minutes ago 32 Commits

1 Branch 0 Tags

Go to file

Code

Factual mi primer commit

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

