

Entrenamiento de una CNN con YOLO-NAS para la detección de latas en el océano

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¿Por qué?



Utilidades



Mantener registro



Realizar estudios



Posible reutilización






Protección de especies

¿Cómo?

Etiquetado






Sets de datos




-  Train (70 %)
-  Validation (15 %)
-  Test (15 %)

Sets de datos



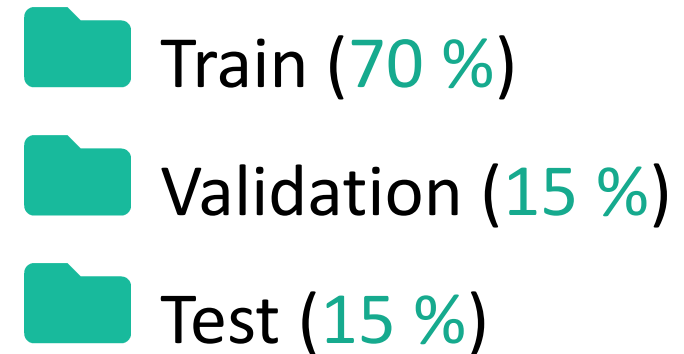
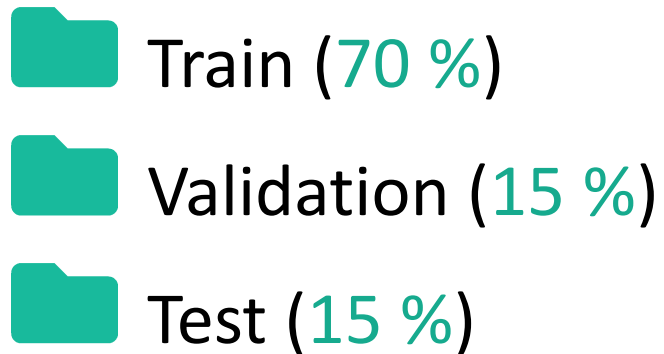
-  Train (70 %)
-  Validation (15 %)
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-  Train (70 %)
-  Validation (15 %)
-  Test (15 %)

Sets de datos

Automatizado



- Cantidad de imágenes a usar
- Shuffle de imágenes.
- Agregado al nombre el video origen.
- Creación de la estructura.

You Only Look Once

Neural Architecture Search

You Only Look Once

Neural Architecture Search

You Only Look Once



Neural Architecture Search



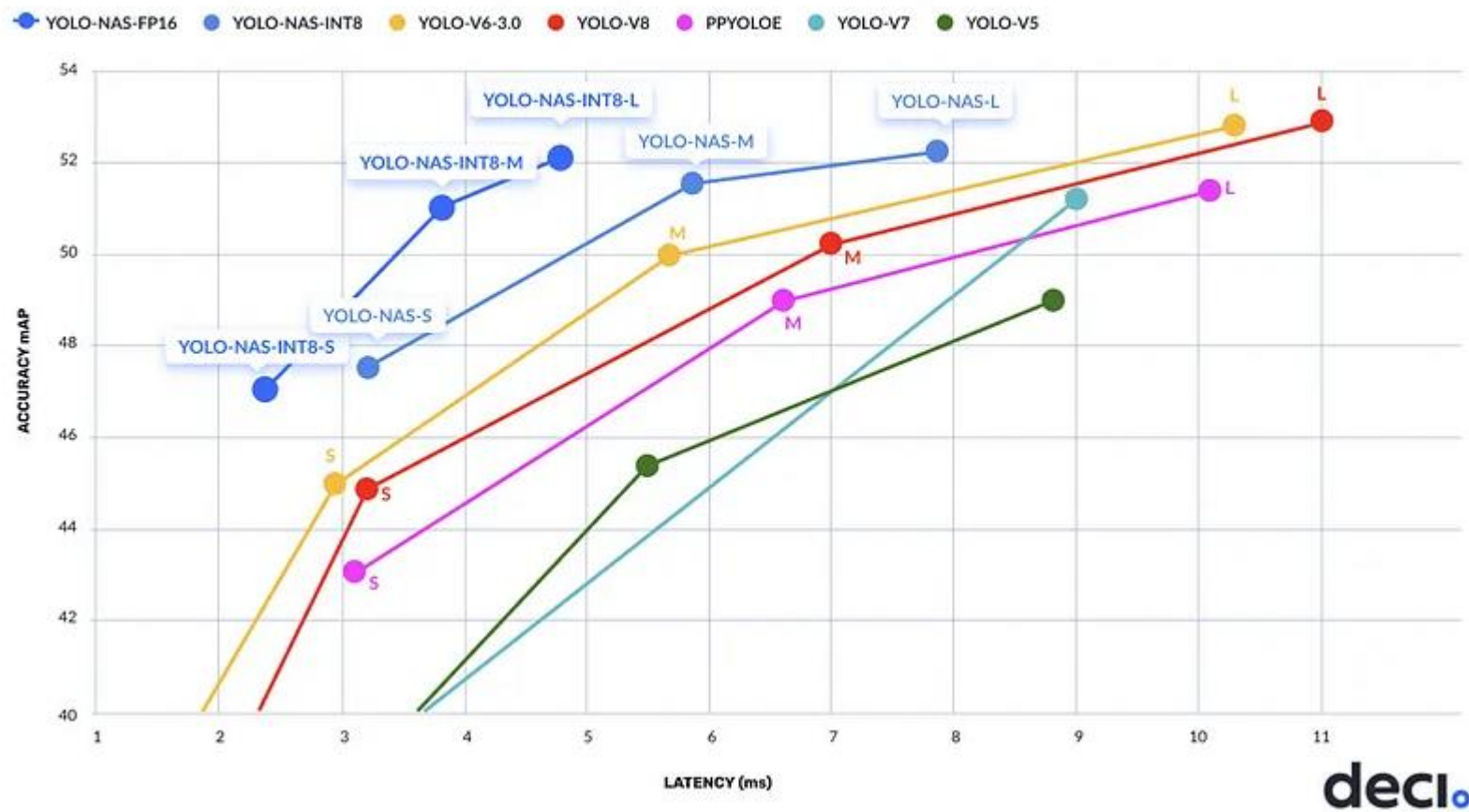
YOLO-NAS

YOLO-NAS

- Un solo barrido de la imagen.
- Diseño de arquitectura automático con AutoNAS.
- Preentrenamiento.
- Opciones: Small, Medium, Large.

YOLO-NAS

Efficient Frontier of Object Detection on COCO, Measured on NVIDIA T4





truck 0.28

person 0.97

person 0.98

person 0.77

person 0.63

person 0.87

person 0.26

person 0.56

person 0.29

person 0.26

person 0.26

car 0.97

car 0.82

car 0.82

car 0.52

person 0.9

car 0.95

backpack 0.27

backpack 0.94

car 0.26





Training


Visualización de datos





Training






Métricas en tiempo real

TensorBoard **TIME SERIES** **SCALARS** **TEXT** **INACTIVE**    

 Filter runs (regex)

 Filter tags (regex)

All **Scalars** **Image** **Histogram**  **Settings**


<input checked="" type="checkbox"/> Run ↑ 	map@0.50:0.95	▼
<input checked="" type="checkbox"/> All_avl_data 	ppyoloeloss 4 cards	▼
<input checked="" type="checkbox"/> First_train 	precision@0.50	▼
<input checked="" type="checkbox"/> More_epochs 	precision@0.50:0.95	▼
<input checked="" type="checkbox"/> Simpler_data 	recall@0.50	▼
	recall@0.50:0.95	▼
	test_inference_time	▼
	train_inference_time	▼
	train_ppyoloeloss 4 cards	▼
	valid_f1@0.50	▼
	valid_f1@0.50:0.95	▼
	valid_inference_time	▼
	valid_map@0.50	▼

(Scalars only)

☐ Enable Range Selection

☐ Link by step 125

Card Width



SCALARS

Smoothing

0,6

Tooltip sorting method

Alphabetical ▼

☒ Ignore outliers in chart scaling

☐ Partition non-monotonic X axis ?

HISTOGRAMS

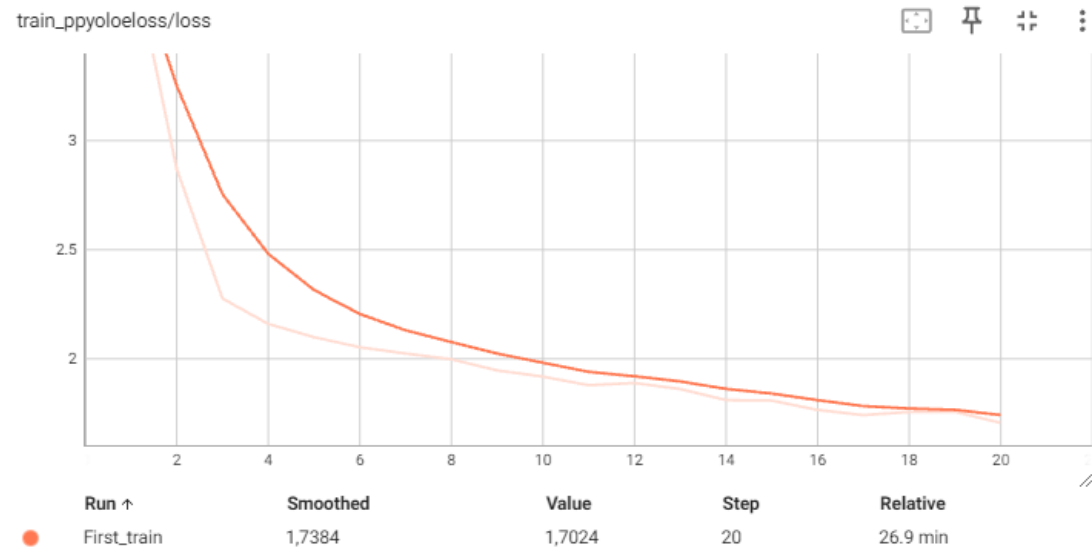
Mode

Offset ▼

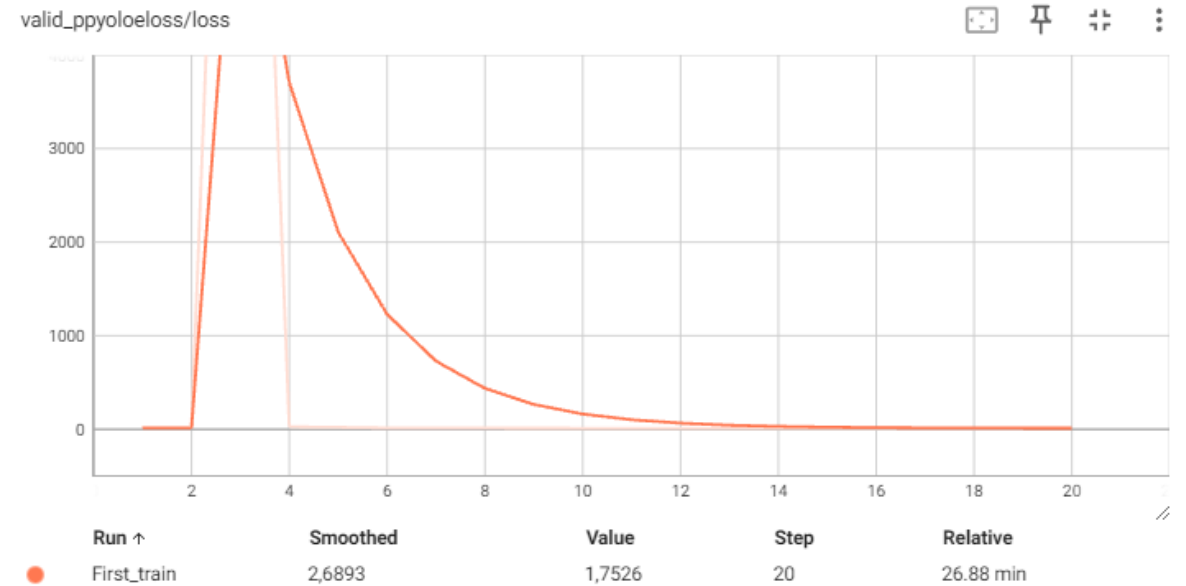
Training

Métricas en tiempo real

train_ppyoloeloss/loss



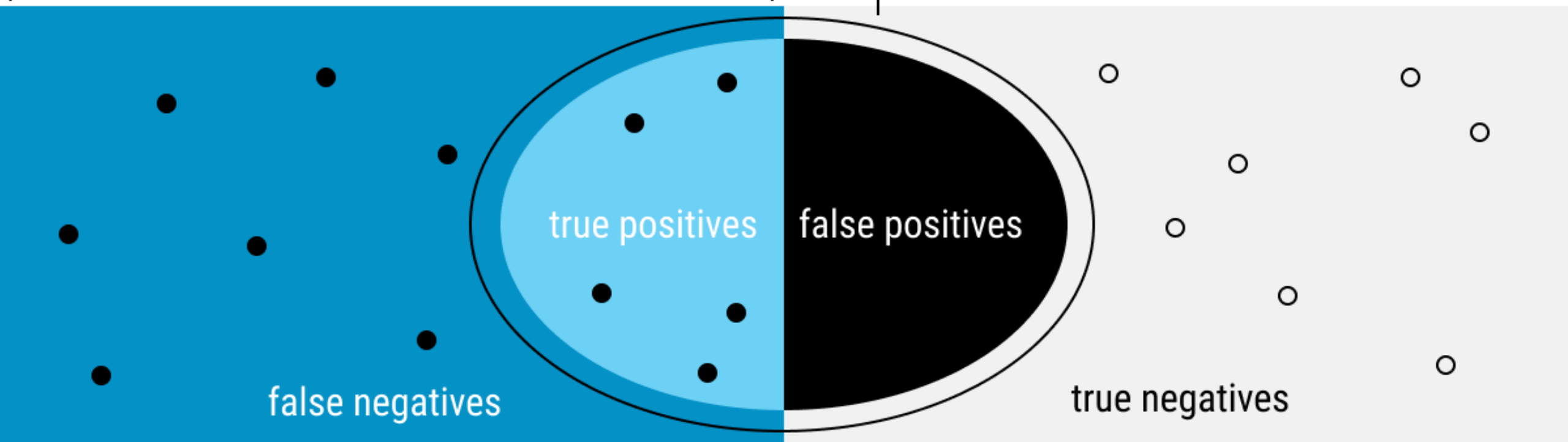
valid_ppyoloeloss/loss



Test

relevant elements

selected elements



how many selected items are relevant?

precision =



how many relevant items are selected?

recall =



Test



Map: 0.89



Recall: 1.0



Precision: 0.02



F1: 0.03

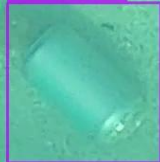
Can 0.7



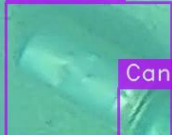
Can 0.72



Can 0.69



Can 0.76



Can 0.72



Can 0.66



Can 0.71

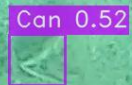
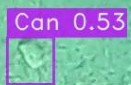
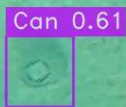
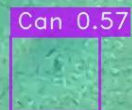


Can 0.73

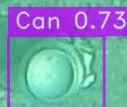
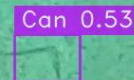
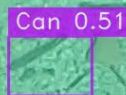
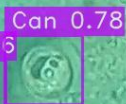


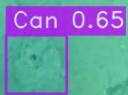
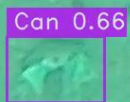
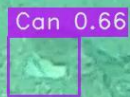
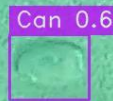
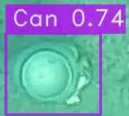
Can 0.72





Test

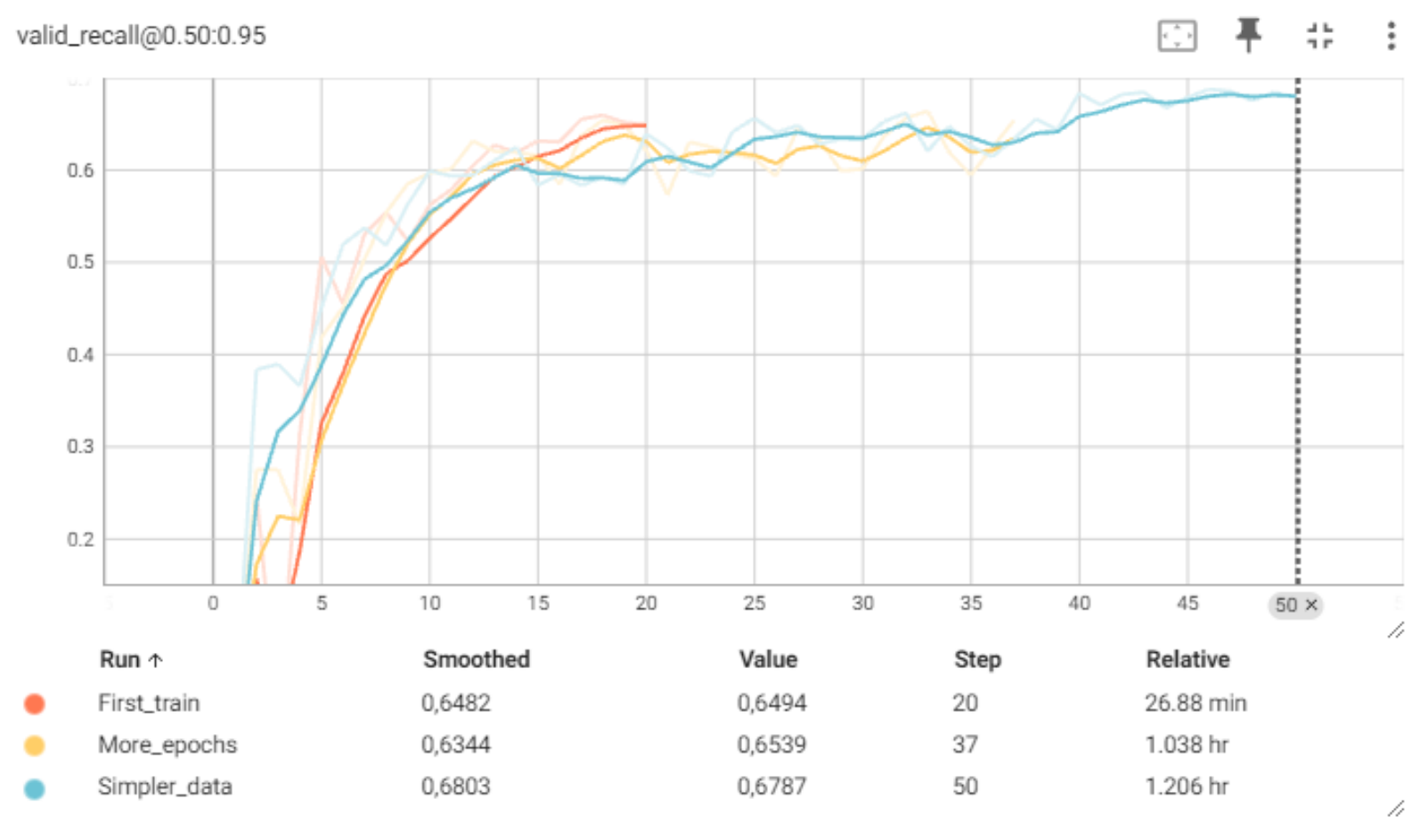




Simplificar datos

Training

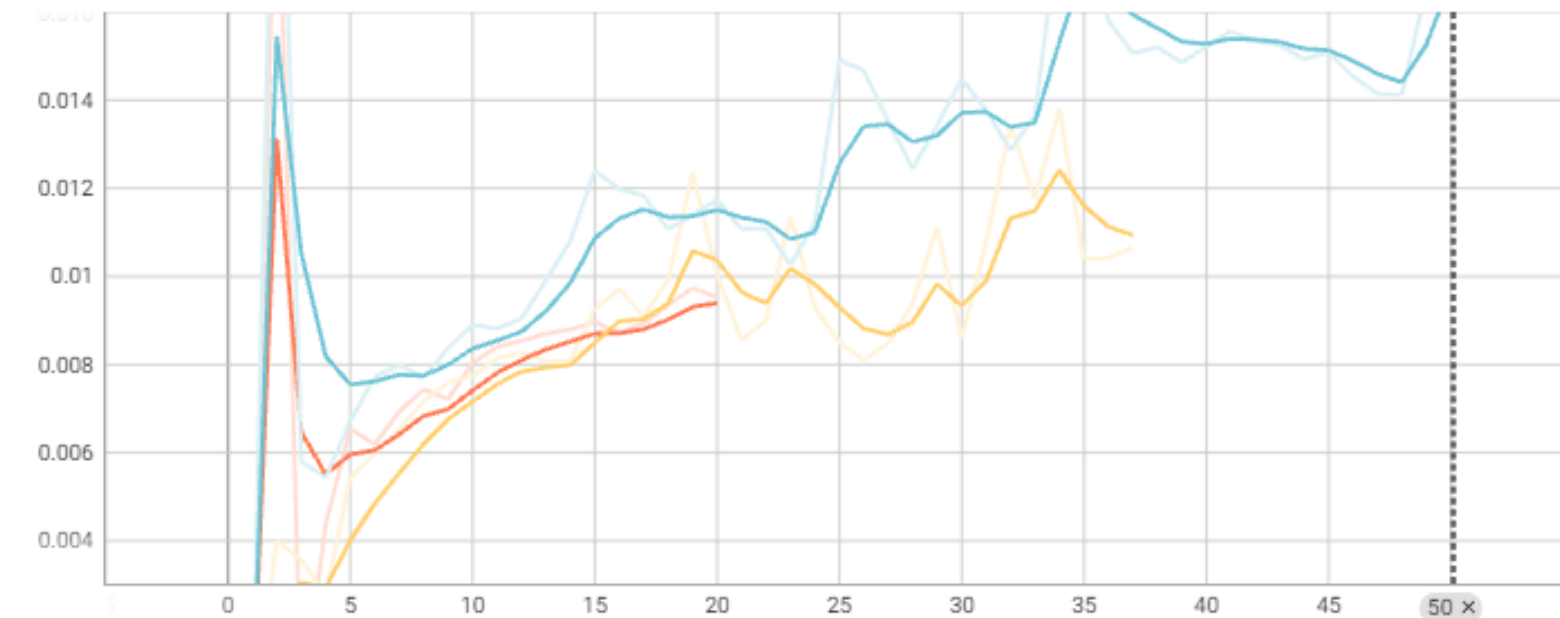
Métricas en tiempo real



Training

Métricas en tiempo real

valid_precision@0.50:0.95

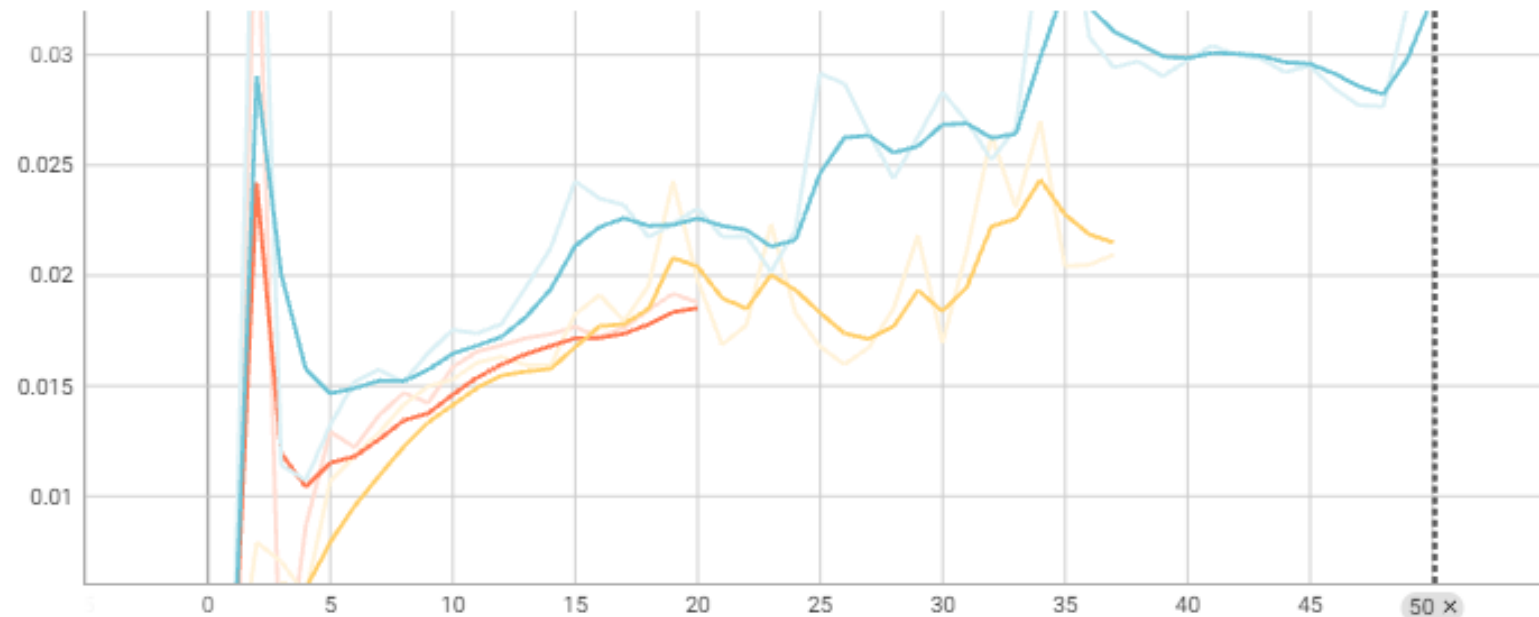


Run ↑	Smoothed	Value	Step	Relative
First_train	0,0094	0,0095	20	26.88 min
More_epochs	0,0109	0,0106	37	1.038 hr
Simpler_data	0,0167	0,0188	50	1.206 hr

Training

Métricas en tiempo real

valid_f1@0.50:0.95



Run ↑	Smoothed	Value	Step	Relative
First_train	0,0185	0,0188	20	26.88 min
More_epochs	0,0215	0,0209	37	1.038 hr
Simpler_data	0,0326	0,0367	50	1.206 hr

Test



Map: 0.94



Recall: 0.99



Precision: 0.84



F1: 0.91

Aumento de data

Training

Sets de datos



Train (70 %)



Validation (15 %)



Test (15 %)

Training

Sets de datos



Train (85 %)



Validation (15 %)



~~Test (15 %)~~

Training

Sets de datos



Train (85 %)



Validation (15 %)



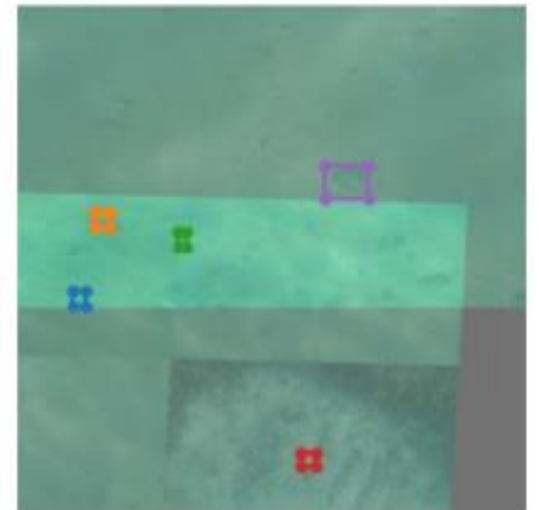
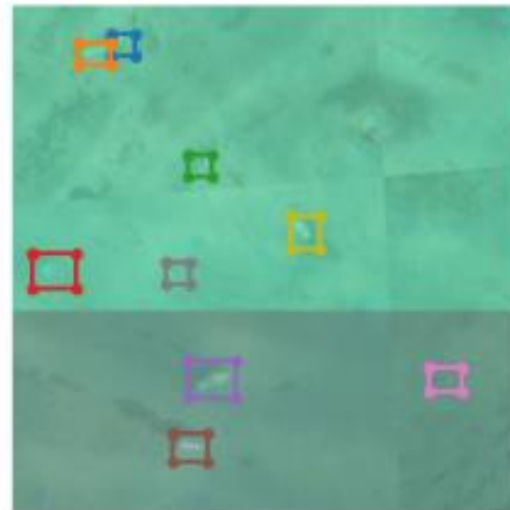
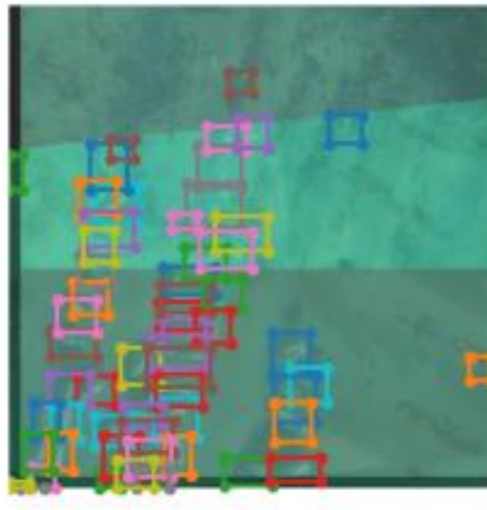
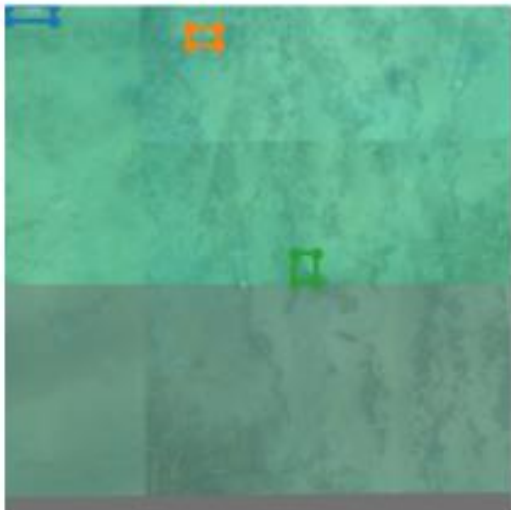
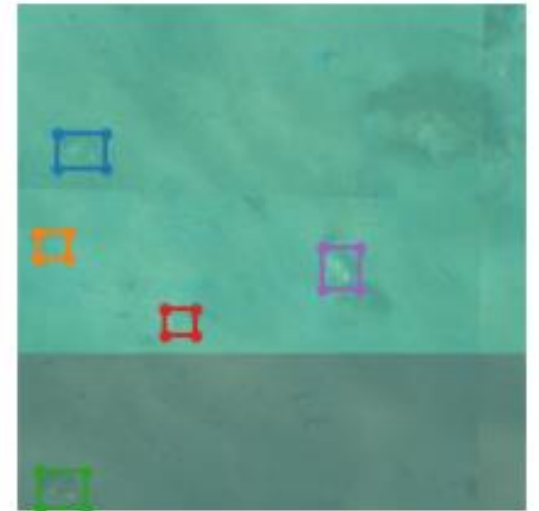
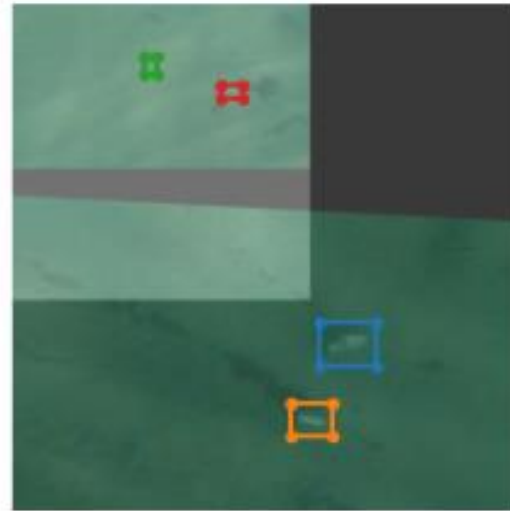
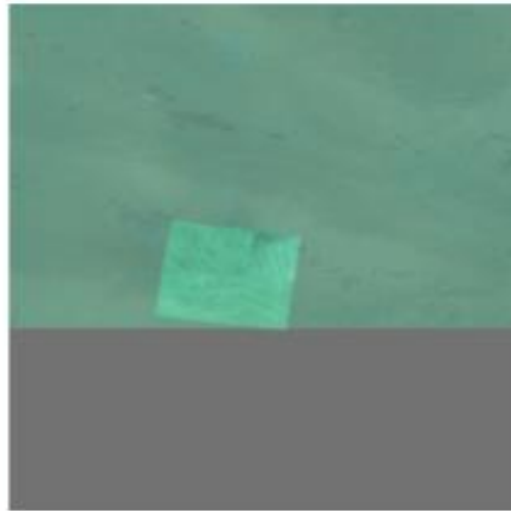
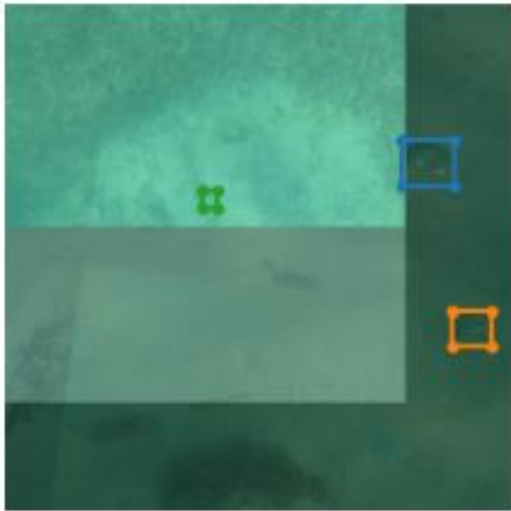
~~Test (15 %)~~

+

Transformaciones

Training

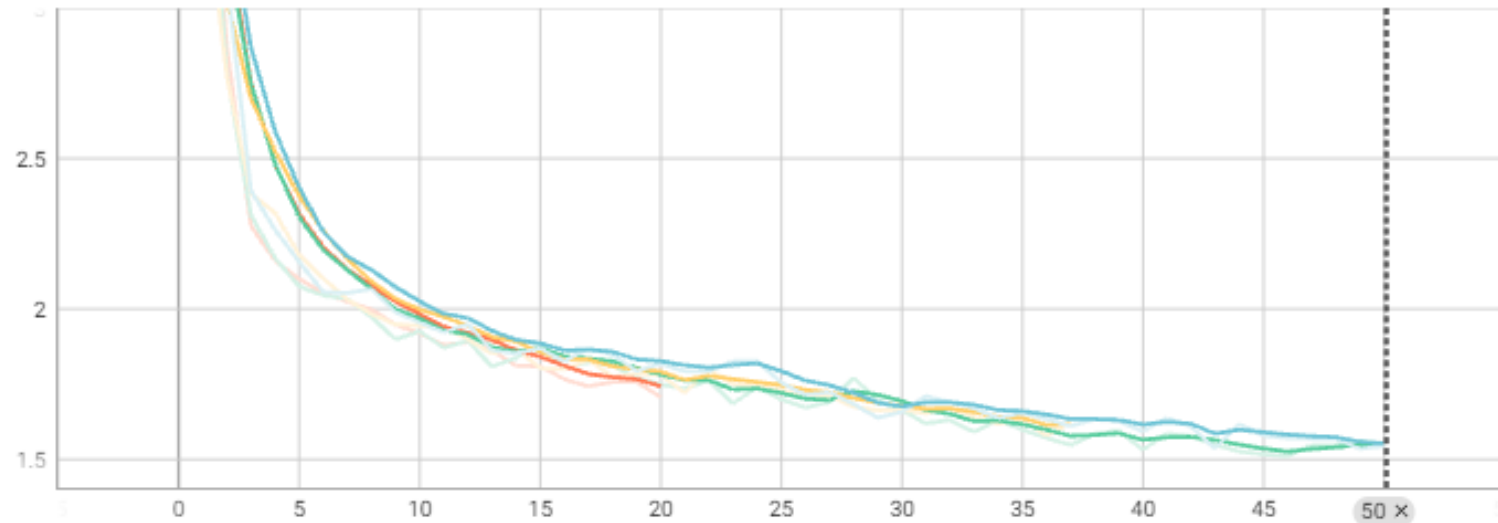
Transformaciones



Training

Métricas en tiempo real

train_ppyoloeloss/loss

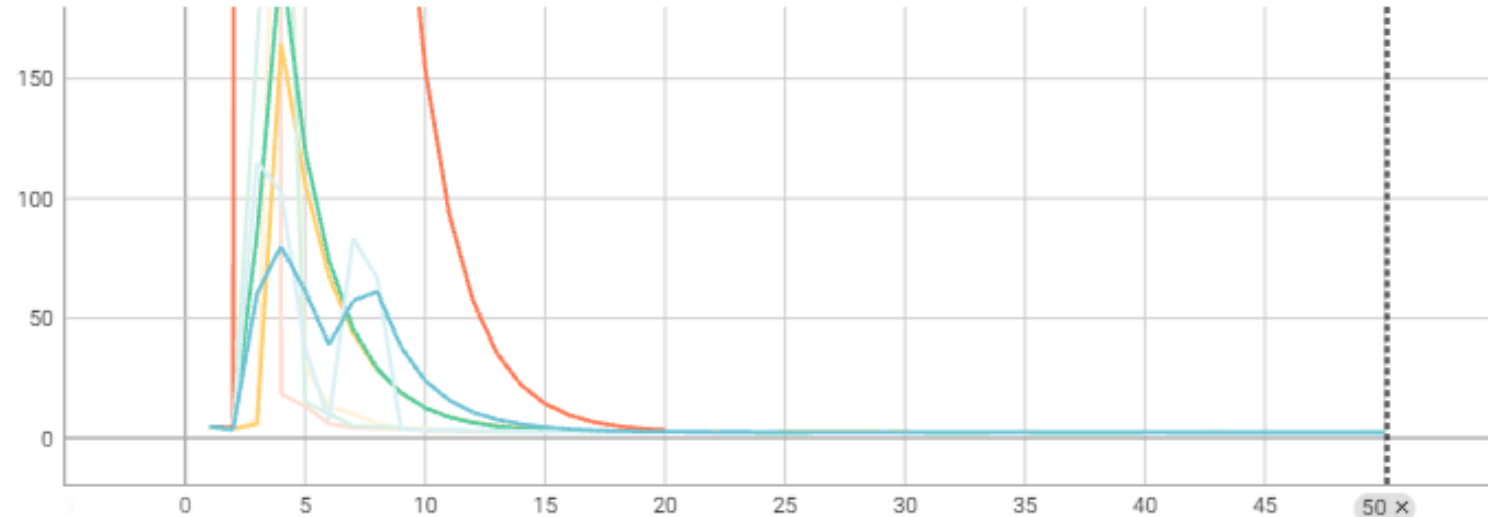


Run ↑	Smoothed	Value	Step	Relative
● All_avl_data	1,5452	1,5482	50	1.239 hr
● First_train	1,7384	1,7024	20	26.9 min
● More_epochs	1,6118	1,6161	37	1.038 hr
● Simpler_data	1,5473	1,5383	50	1.206 hr

Training

Métricas en tiempo real

valid_ppyoloeloss/loss



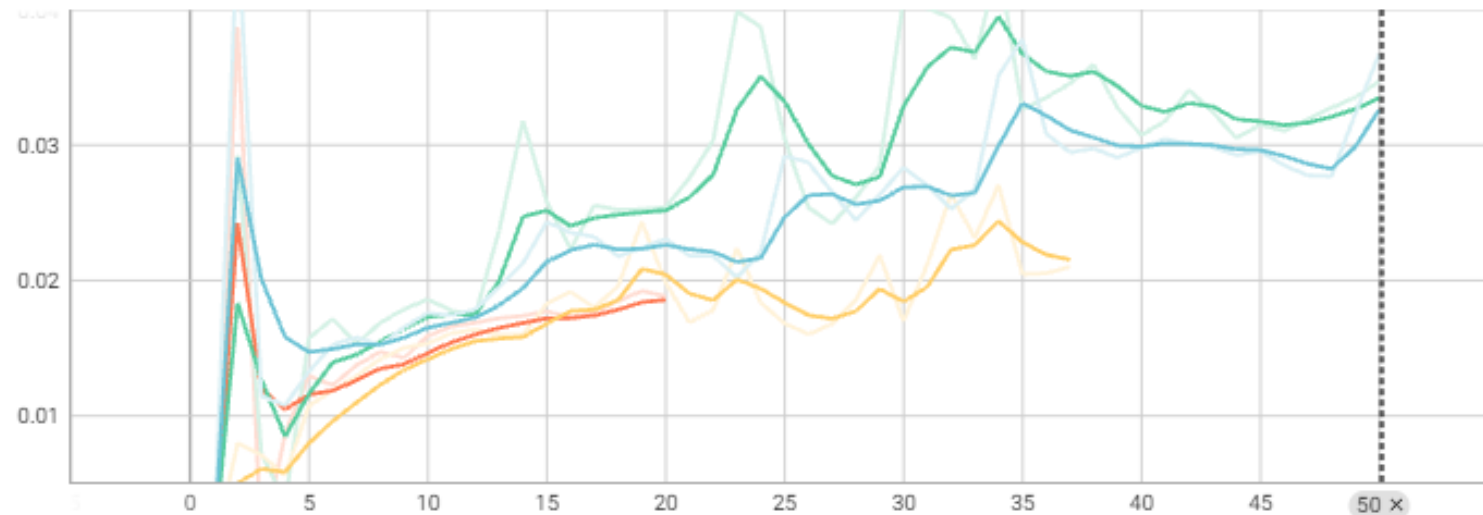
Run ↑	Smoothed	Value	Step	Relative
● All_avl_data	1,7635	1,7454	50	1.239 hr
● First_train	2,6893	1,7526	20	26.88 min
● More_epochs	1,7629	1,7119	37	1.038 hr
● Simpler_data	1,6155	1,5672	50	1.206 hr

^

Training

Métricas en tiempo real

valid_f1@0.50:0.95



Run ↑	Smoothed	Value	Step	Relative
● All_avl_data	0,0334	0,0347	50	1.239 hr
● First_train	0,0185	0,0188	20	26.88 min
● More_epochs	0,0215	0,0209	37	1.038 hr
● Simpler_data	0,0326	0,0367	50	1.206 hr

(Video)

Entrenamiento de una CNN con YOLO-NAS para la detección de latas en el océano

