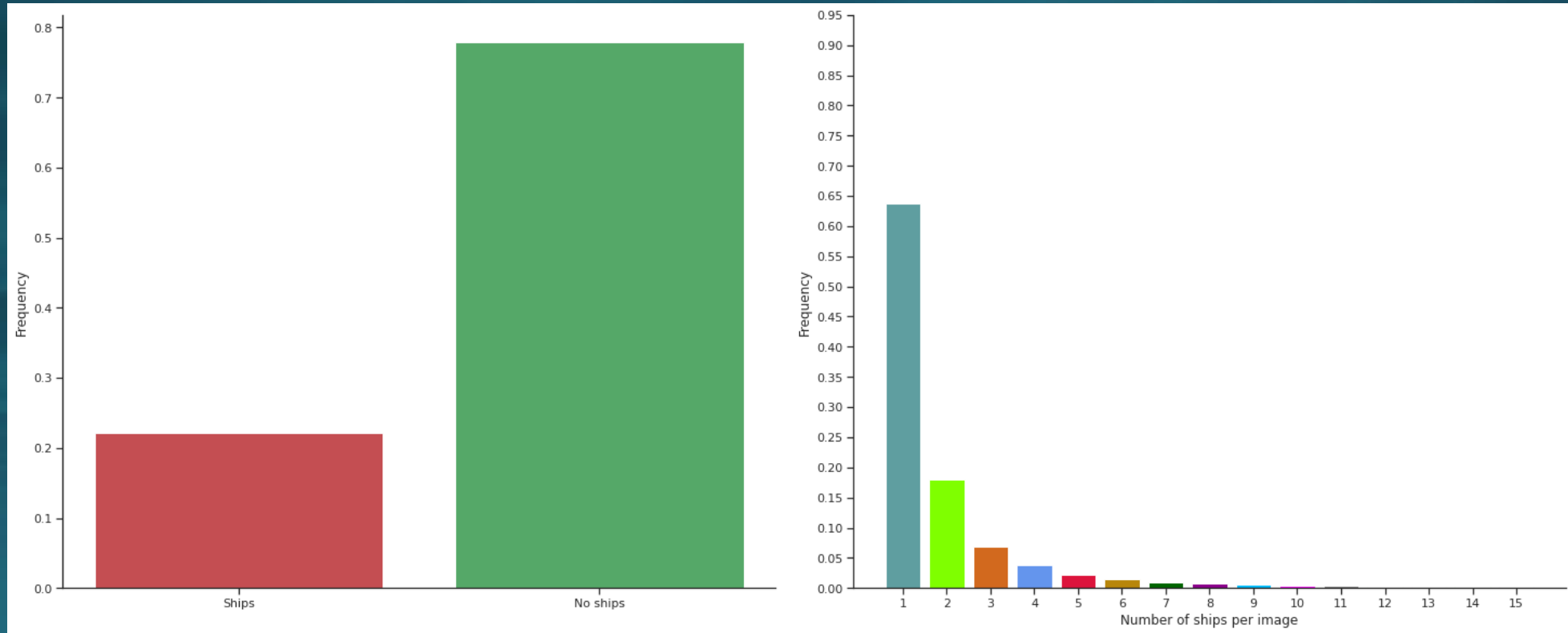




Airbus Ship Detection Challenge

Giosuè Zannini matr. 873810
Academic year 2021/2022

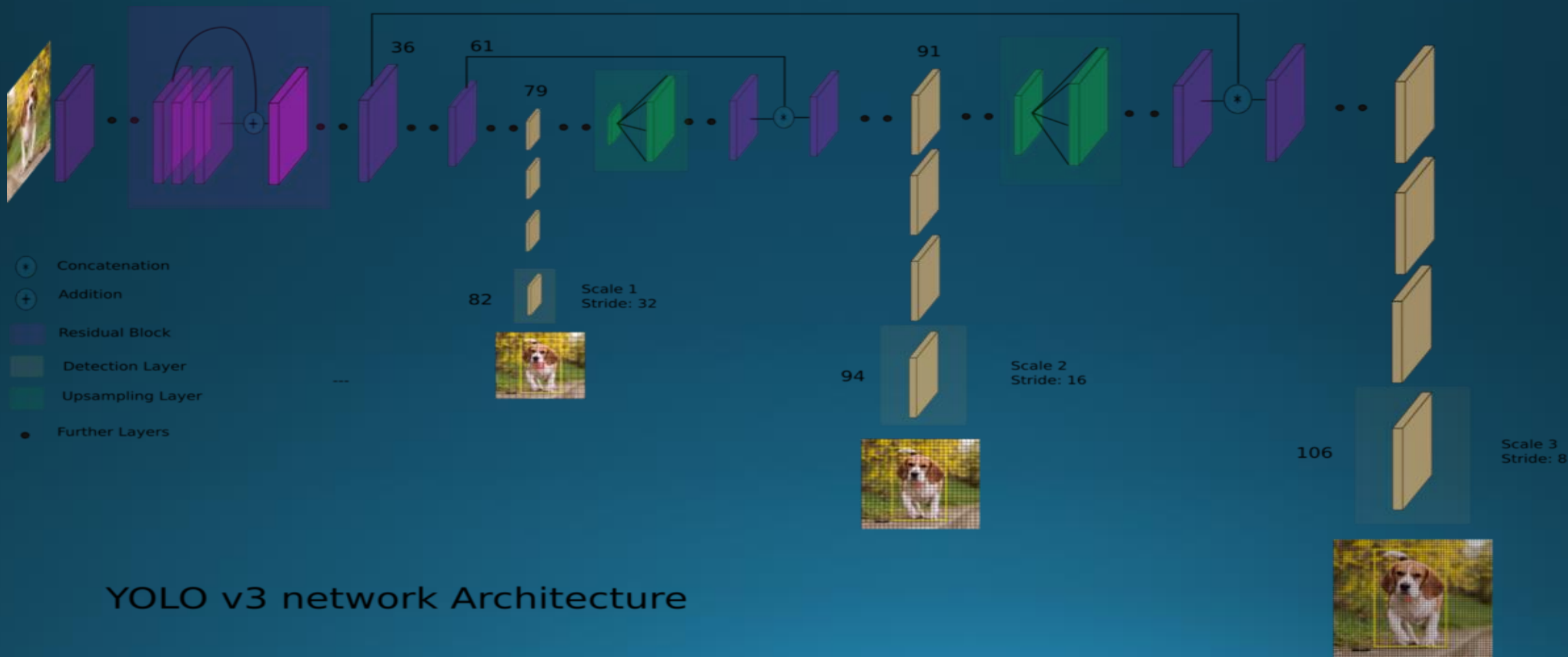
Summary of DataSet



	All examples	Positive examples	Negative examples
Size	192556	42556	150000

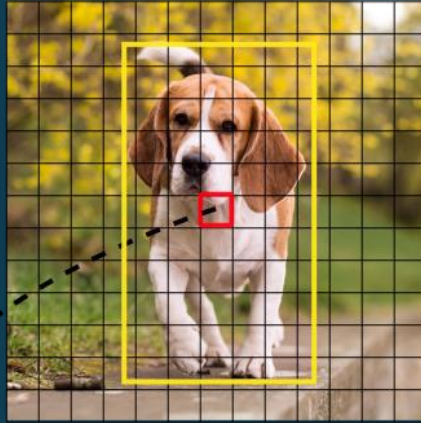


YOLO v3



How it works

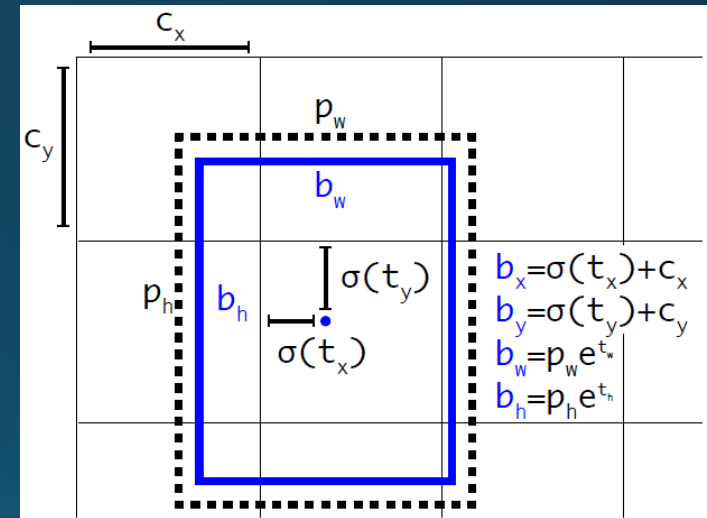
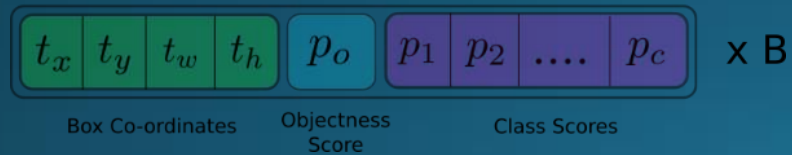
Image Grid. The Red Grid is responsible for detecting the dog



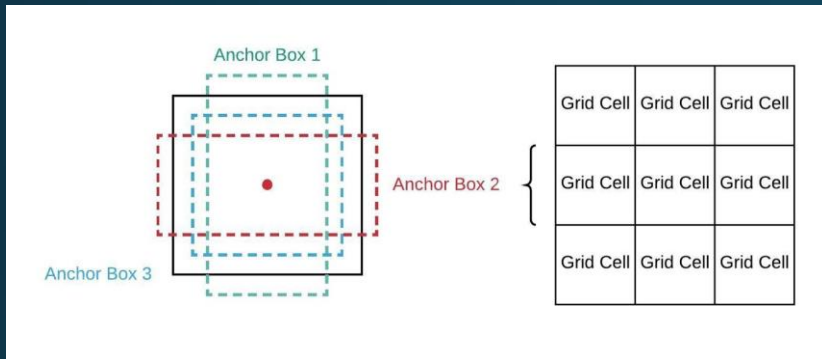
Prediction Feature Map



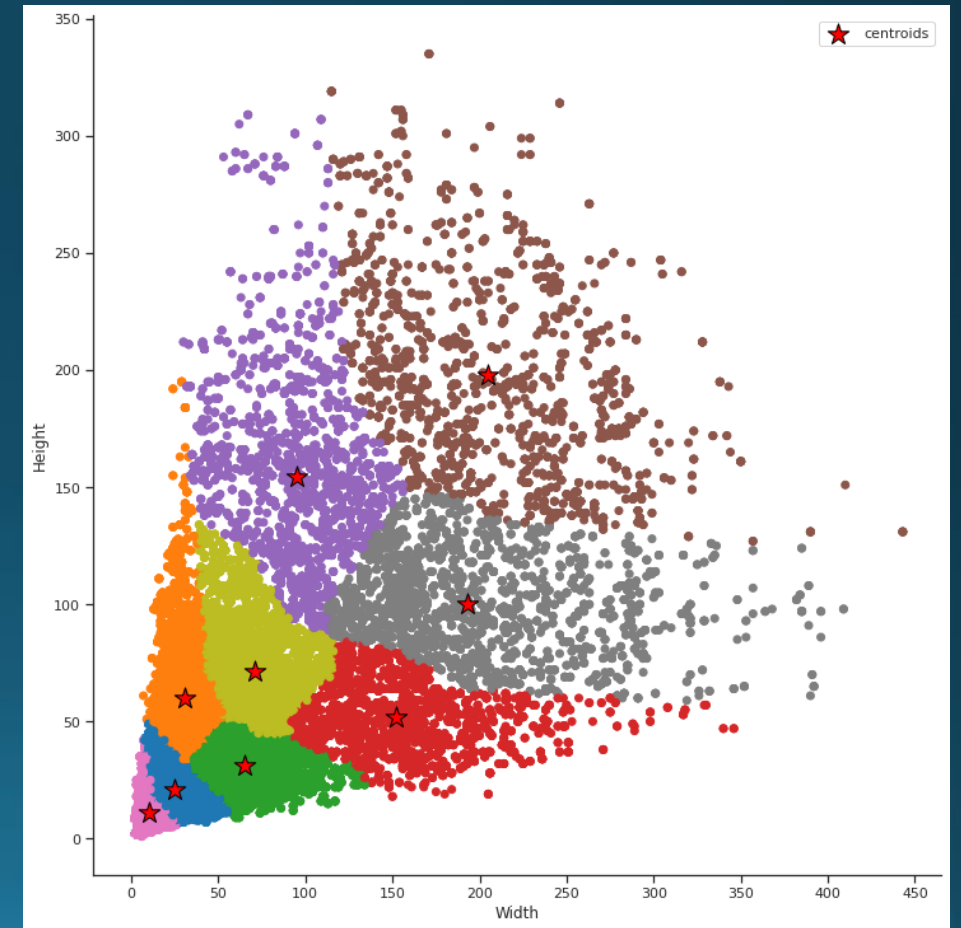
Attributes of a bounding box



Determine Anchors



	Scale 1 [width, height]	Scale 2 [width, height]	Scale 3 [width, height]
Anchor 1	[0.123, 0.200]	[0.084, 0.040]	[0.013, 0.014]
Anchor 2	[0.251, 0.130]	[0.091, 0.092]	[0.031, 0.027]
Anchor 3	[0.266, 0.257]	[0.198, 0.067]	[0.040, 0.078]



Loss Function

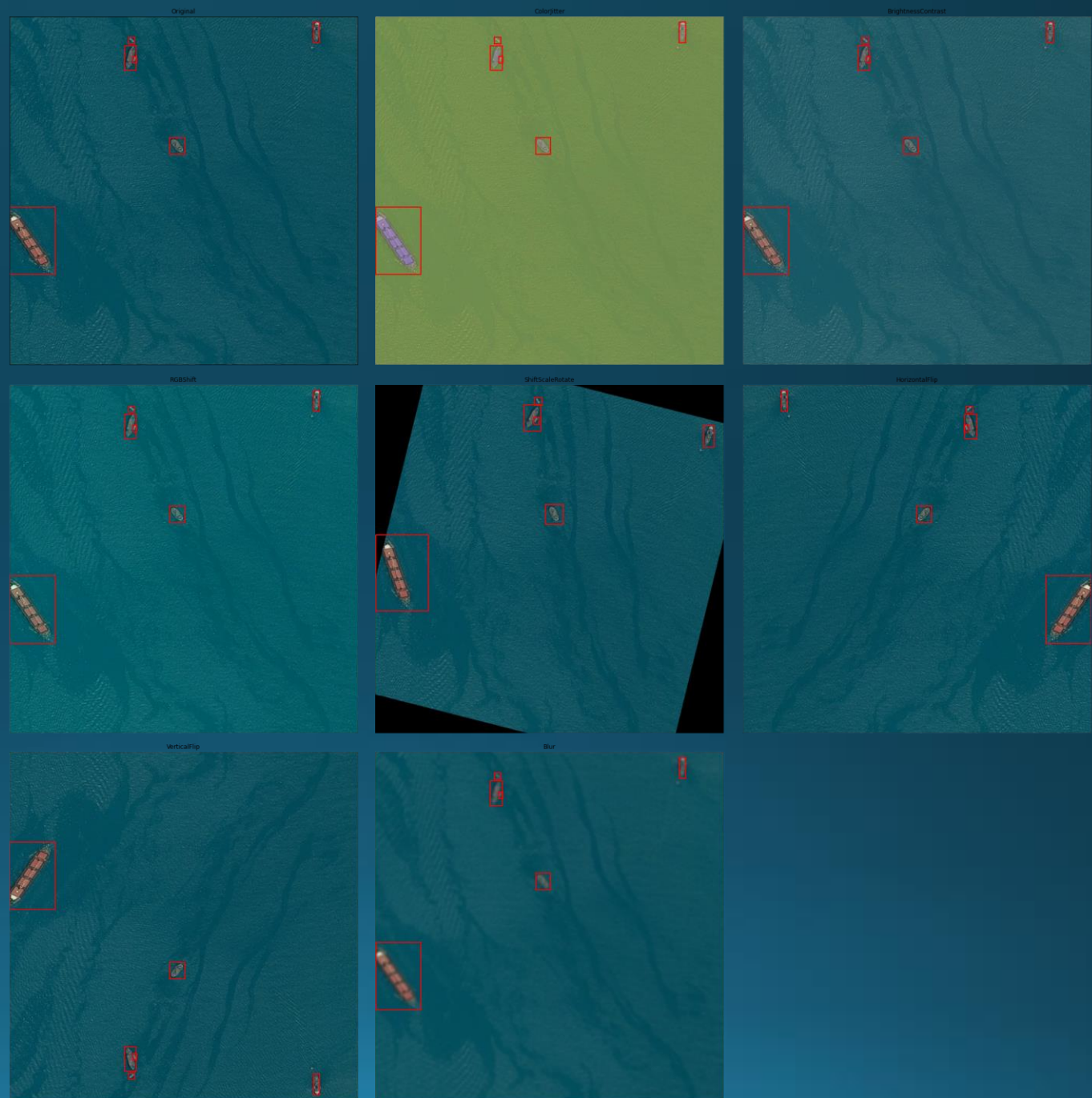
Regression Loss

$$\begin{aligned} & \lambda_{coord} \sum_{i=0}^{S^2} \sum_{j=0}^B 1_{ij}^{obj} [(x_i - \hat{x}_i)^2 + (y_i - \hat{y}_i)^2] + \lambda_{coord} \sum_{i=0}^{S^2} \sum_{j=0}^B 1_{ij}^{obj} \left[(\sqrt{w_i} - \sqrt{\widehat{w}_i})^2 + (\sqrt{h_i} - \sqrt{\widehat{h}_i})^2 \right] \\ & + \lambda_{obj} \sum_{i=0}^{S^2} \sum_{j=0}^B 1_{ij}^{obj} (C_i - \widehat{C}_i)^2 + \lambda_{noobj} \sum_{i=0}^{S^2} \sum_{j=0}^B 1_{ij}^{noobj} (C_i - \widehat{C}_i)^2 + \underbrace{\sum_{i=0}^{S^2} 1_i^{obj} \sum_{c \in \text{classes}} (p_i(c) - \widehat{p}_i(c))^2}_{\text{Classification Loss}} \end{aligned}$$

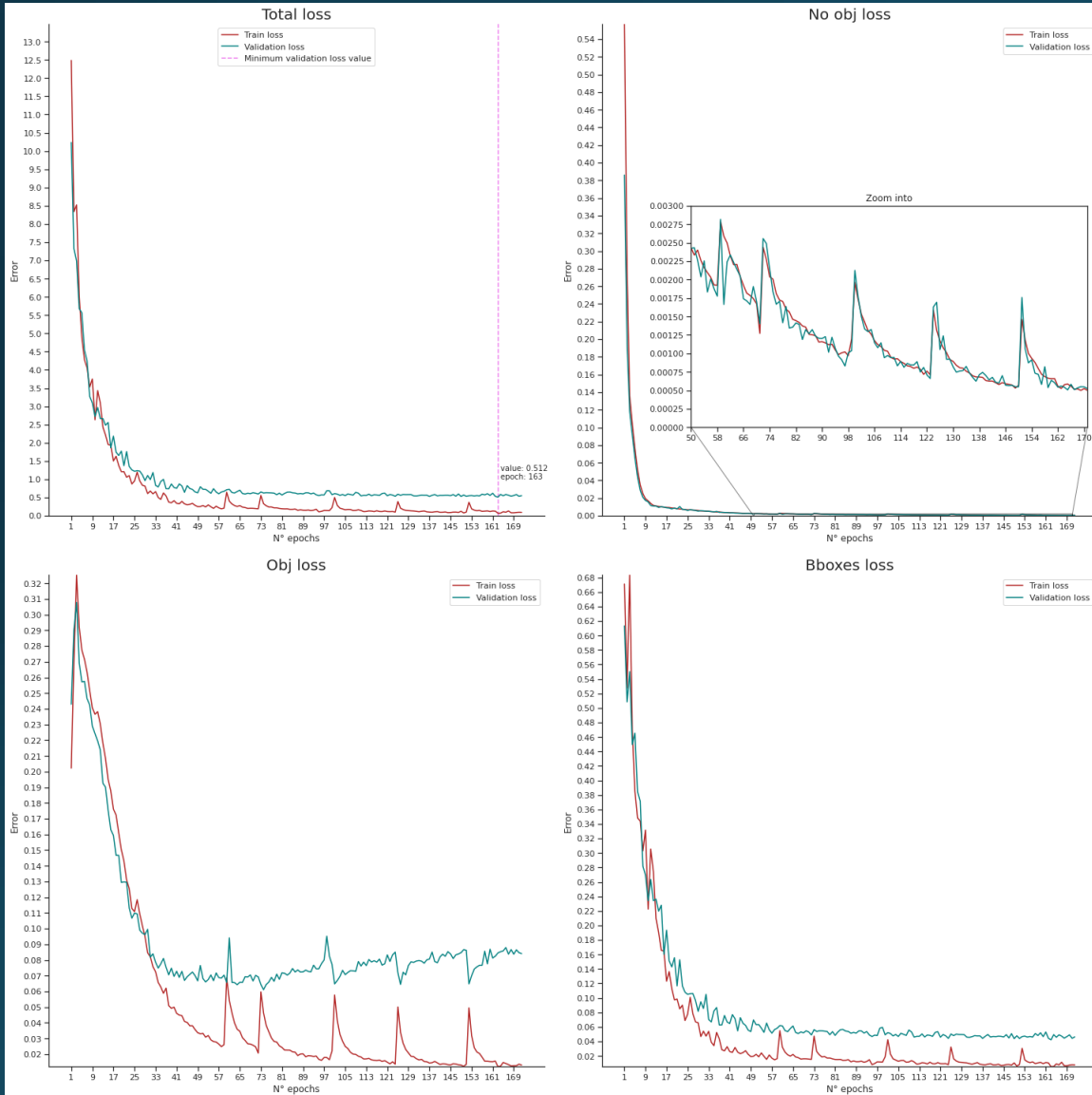
Confidence Loss

Classification Loss

Data Augmentation



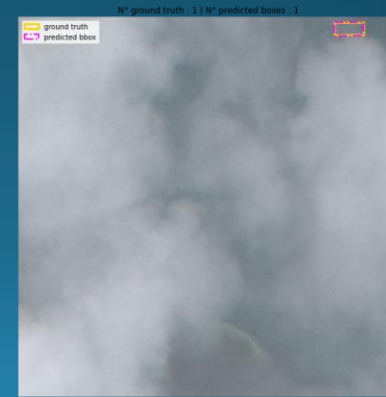
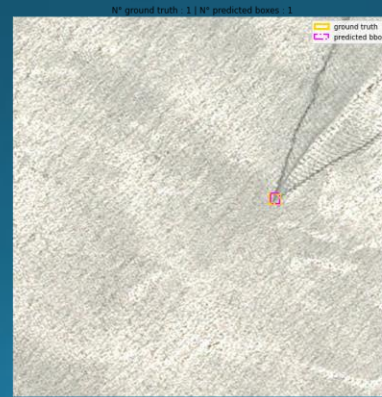
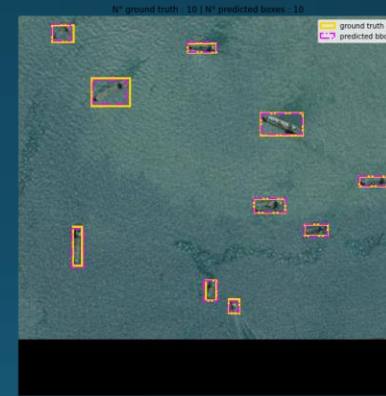
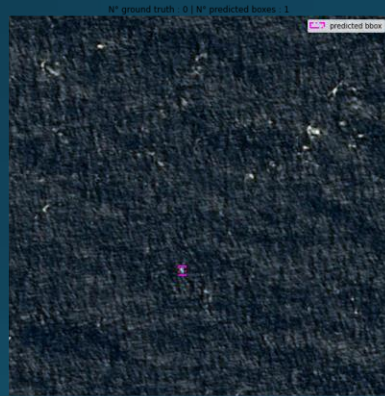
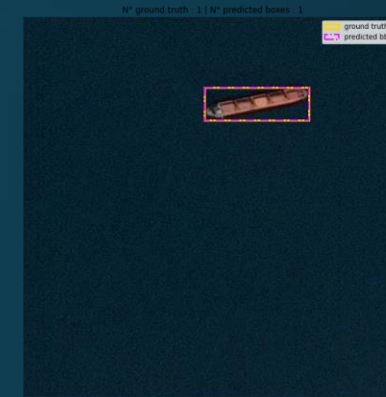
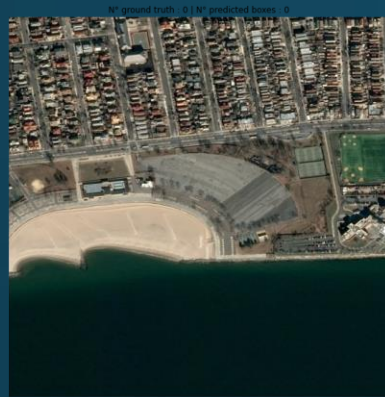
Model tuning



Obj confidence threshold	Overlap threshold				
		0,6	0,7	0,8	0,9
	0,6	0,814	0,816	0,814	0,79
	0,7	0,817	0,82	0,819	0,795
	0,8	0,822	0,821	0,821	0,799
	0,9	0,777	0,779	0,78	0,764
	1,0	0,247	0,245	0,245	0,247

NB: As metric I used Mean Average Precision

Model evaluation



MAP

0,825

MAP₅₀

0,904

MAP₇₅

0,857

An aerial photograph of a large group of small, colorful boats scattered across a dark blue body of water. The boats are in various colors, including red, orange, green, and white. Some boats are moving, leaving white wakes behind them. The text "Thanks for your attention" is centered in the middle of the image in a white, sans-serif font.

Thanks for
your attention