

WHICH CAT IS THIS?

Laura Sanjuán

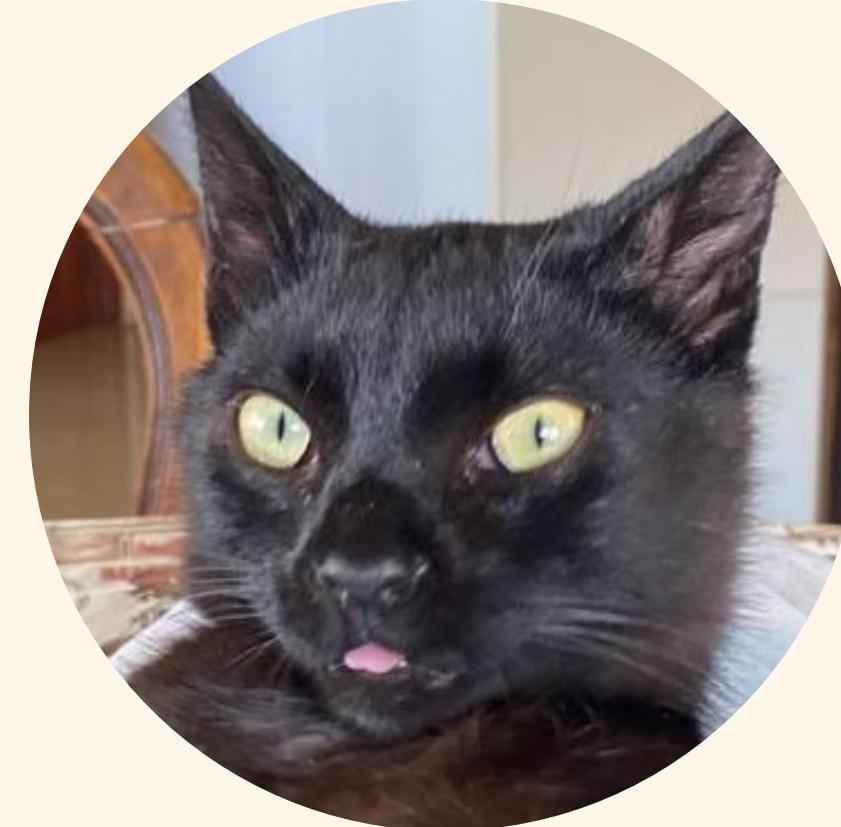
Which cat is this?



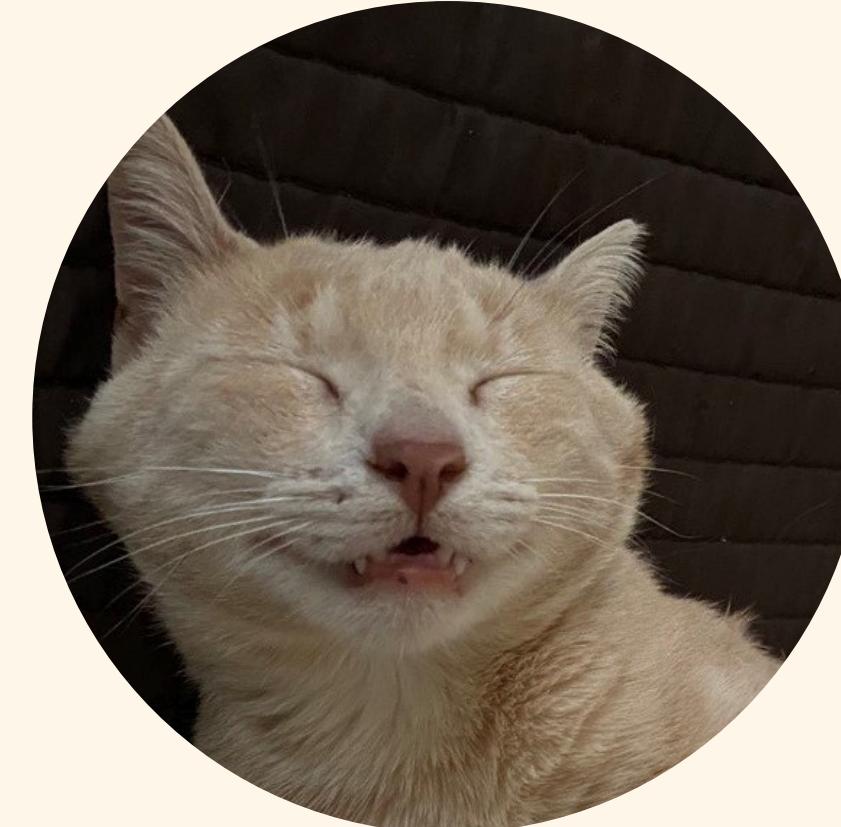
Nina



Uxía



Belcebú



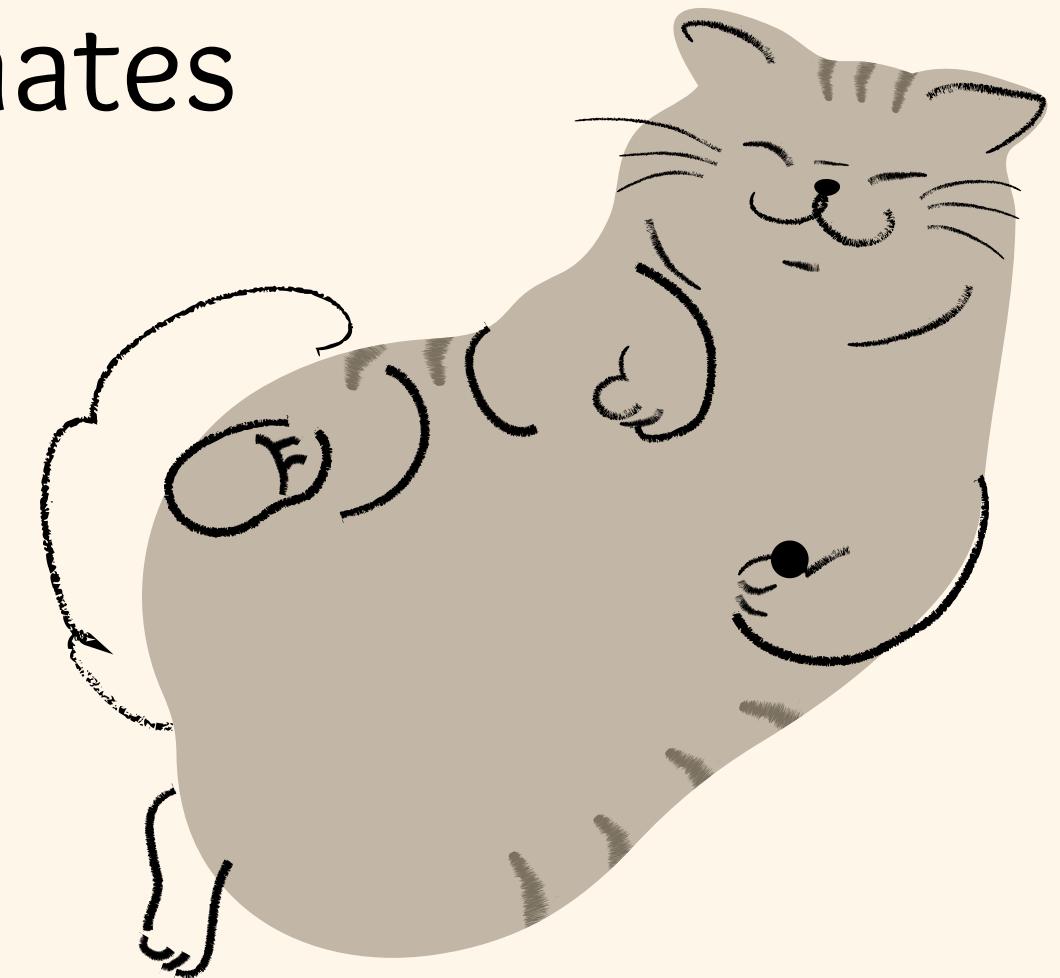
Mazapán

Data

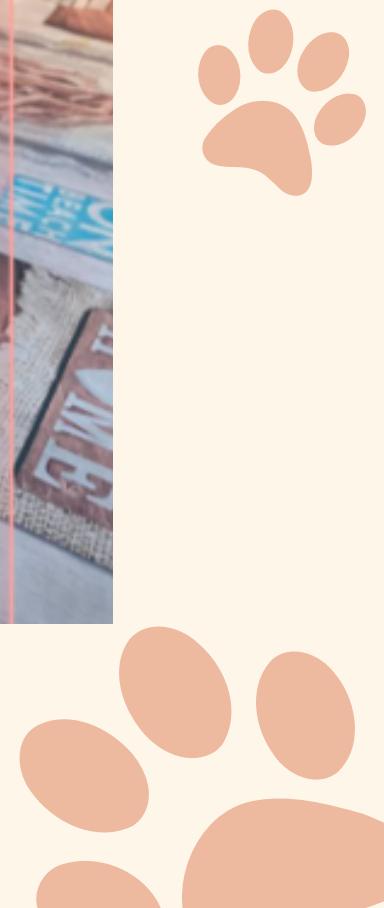
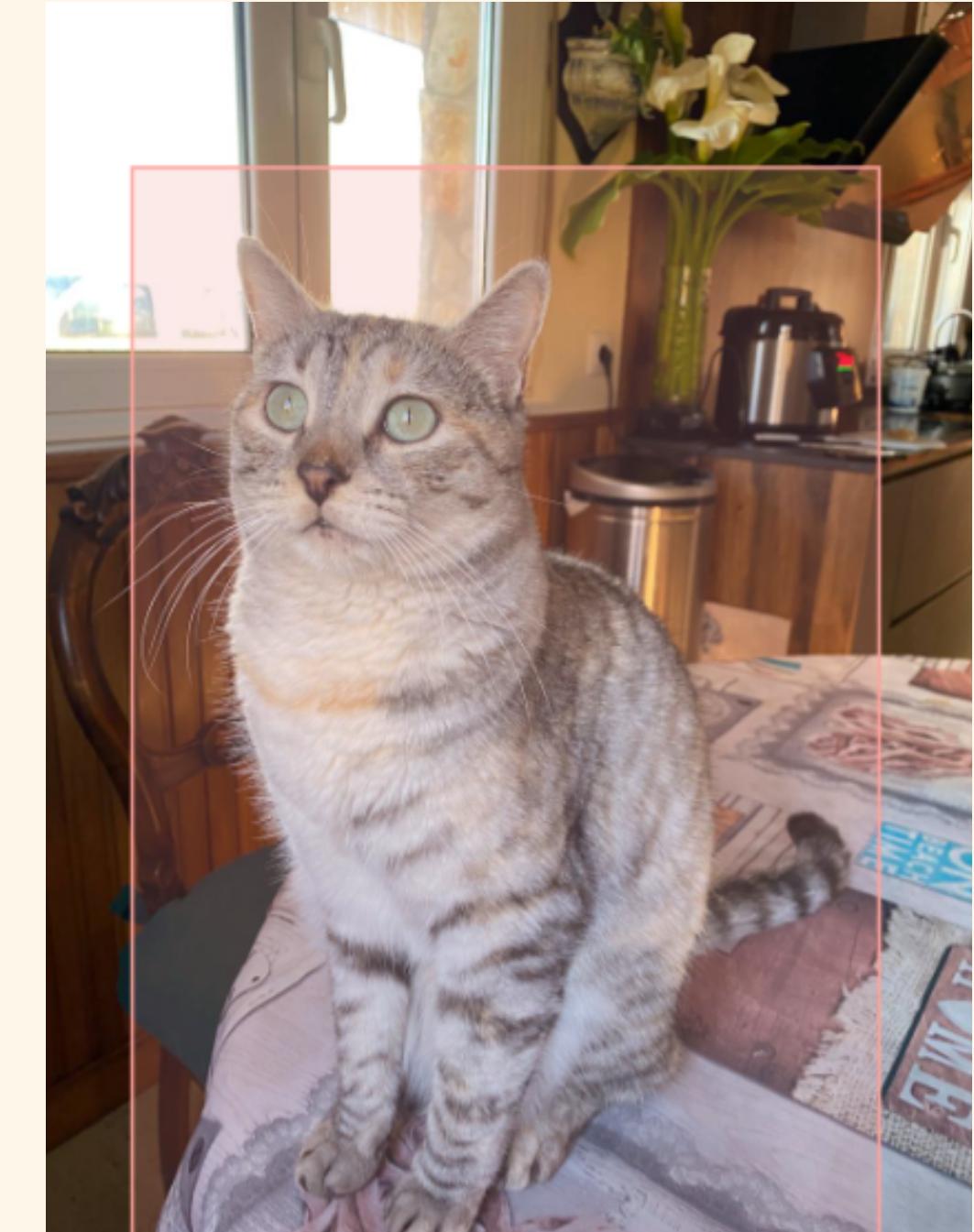


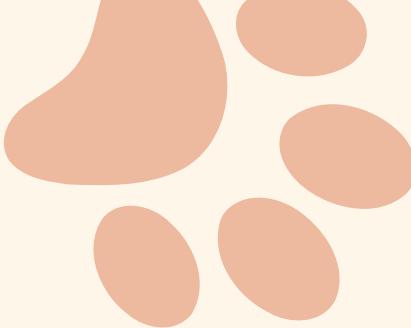
Self-crafted object detection dataset using Label Studio
YOLO format:

- Images in jpg
- txt with the bounding boxes coordinates and labels



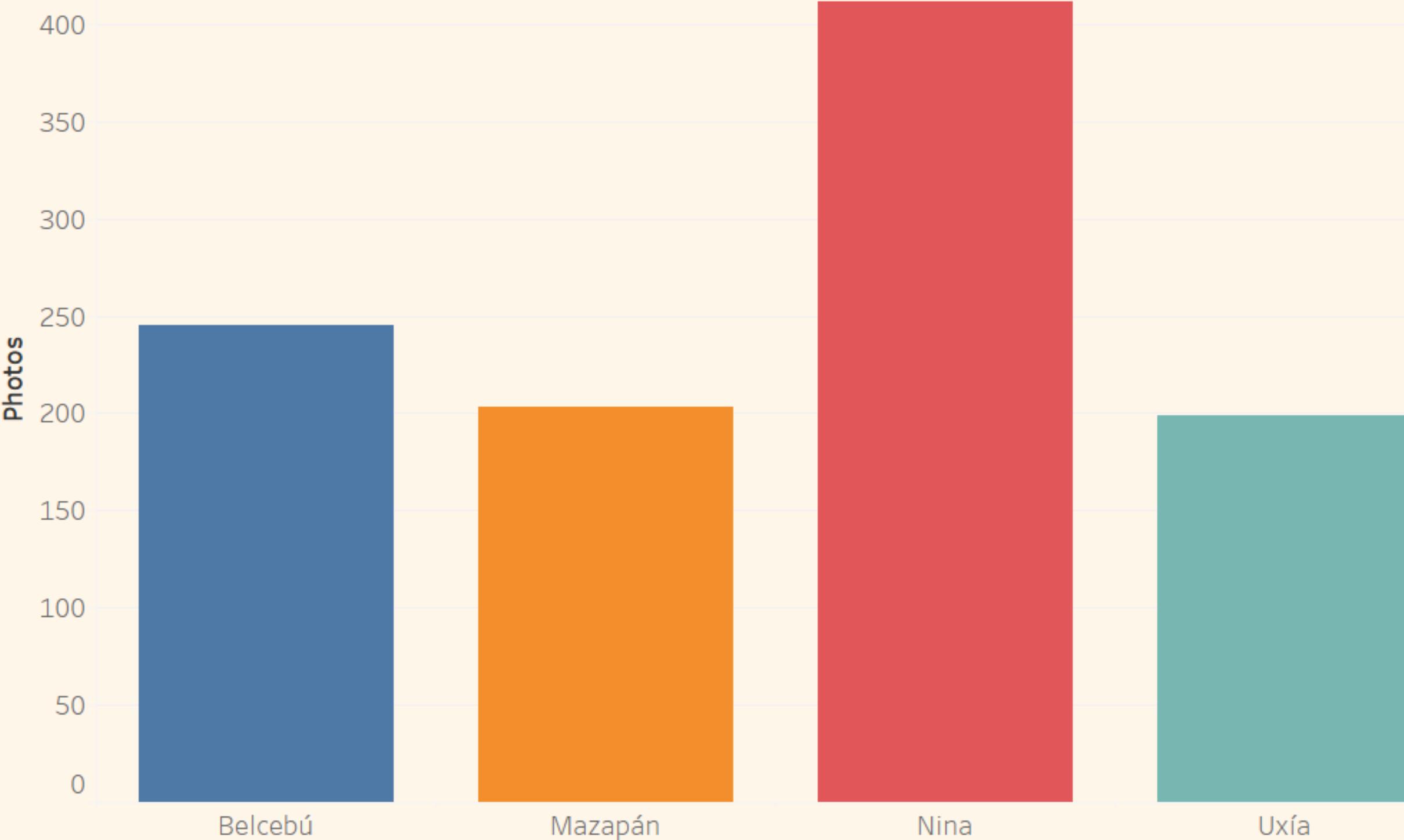
Data





Data

- 882 images
- Classes:
 - Belcebú
 - Mazapán
 - Nina
 - Uxía



YOLOv8n



- Real-time object detection and image segmentation model
- Fine tuning
- High rate of accuracy measured using the COCO dataset
- No underfitting as it generalizes well on the validation dataset. No need to add more parameters and risk overfitting (bias-variance tradeoff)



1st Model

- Keras implementation
- 80 epochs (converged on 15)

Drawbacks

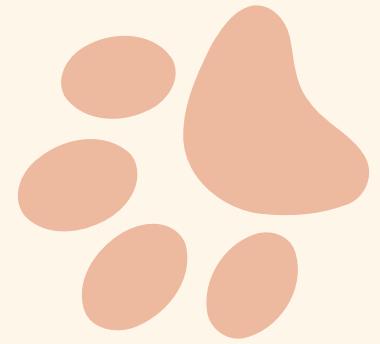
- Hard to use
- Not enough documentation

2nd Model

- Ultralytics implementation
- 100 epochs

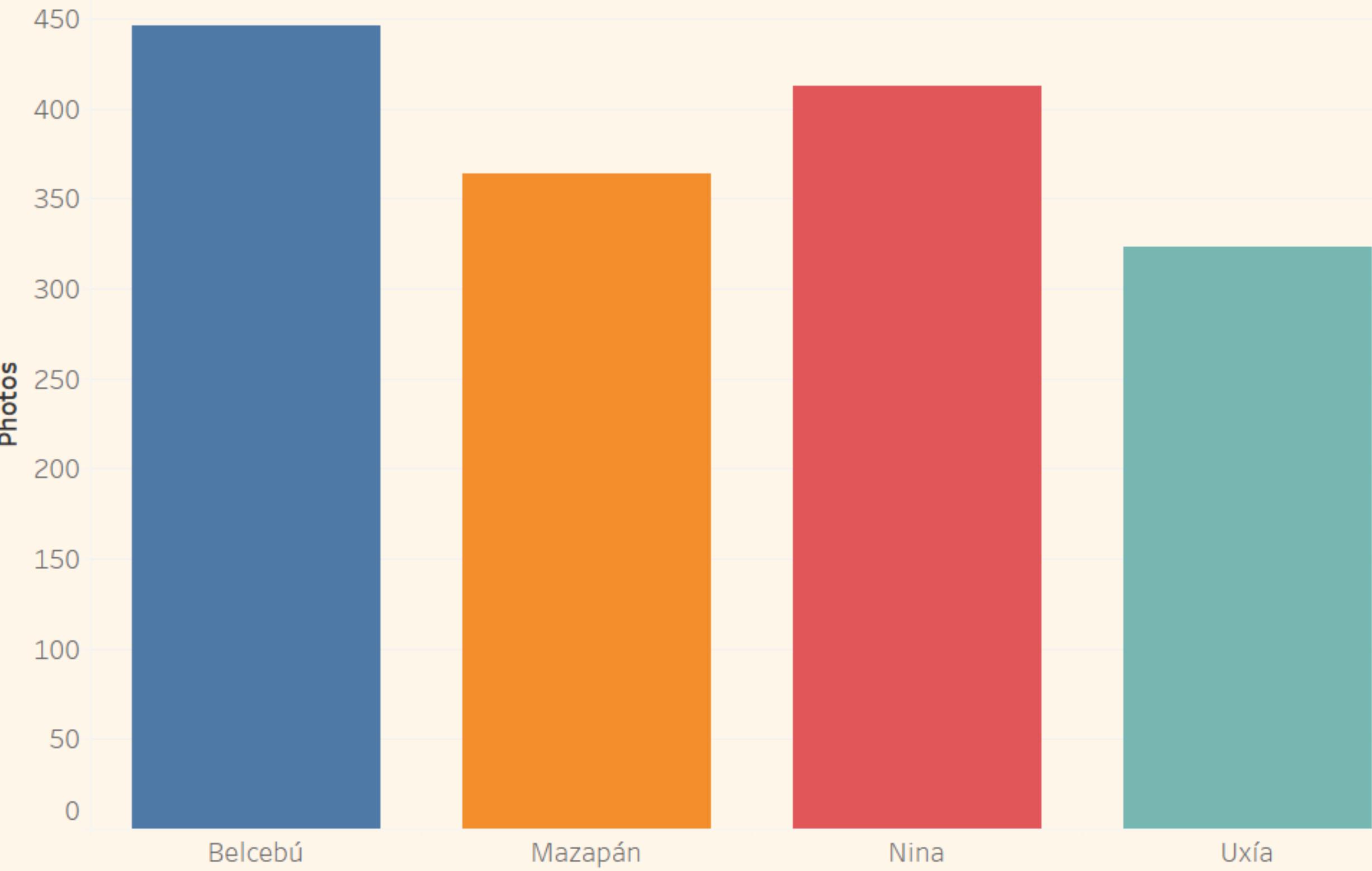
Drawbacks

- Data imbalance
- Dataset could be bigger



- Ultralytics implementation
- Augmentation
- 100 epochs
- 1239 train images
- 107 validation images

3rd Model



Model comparison

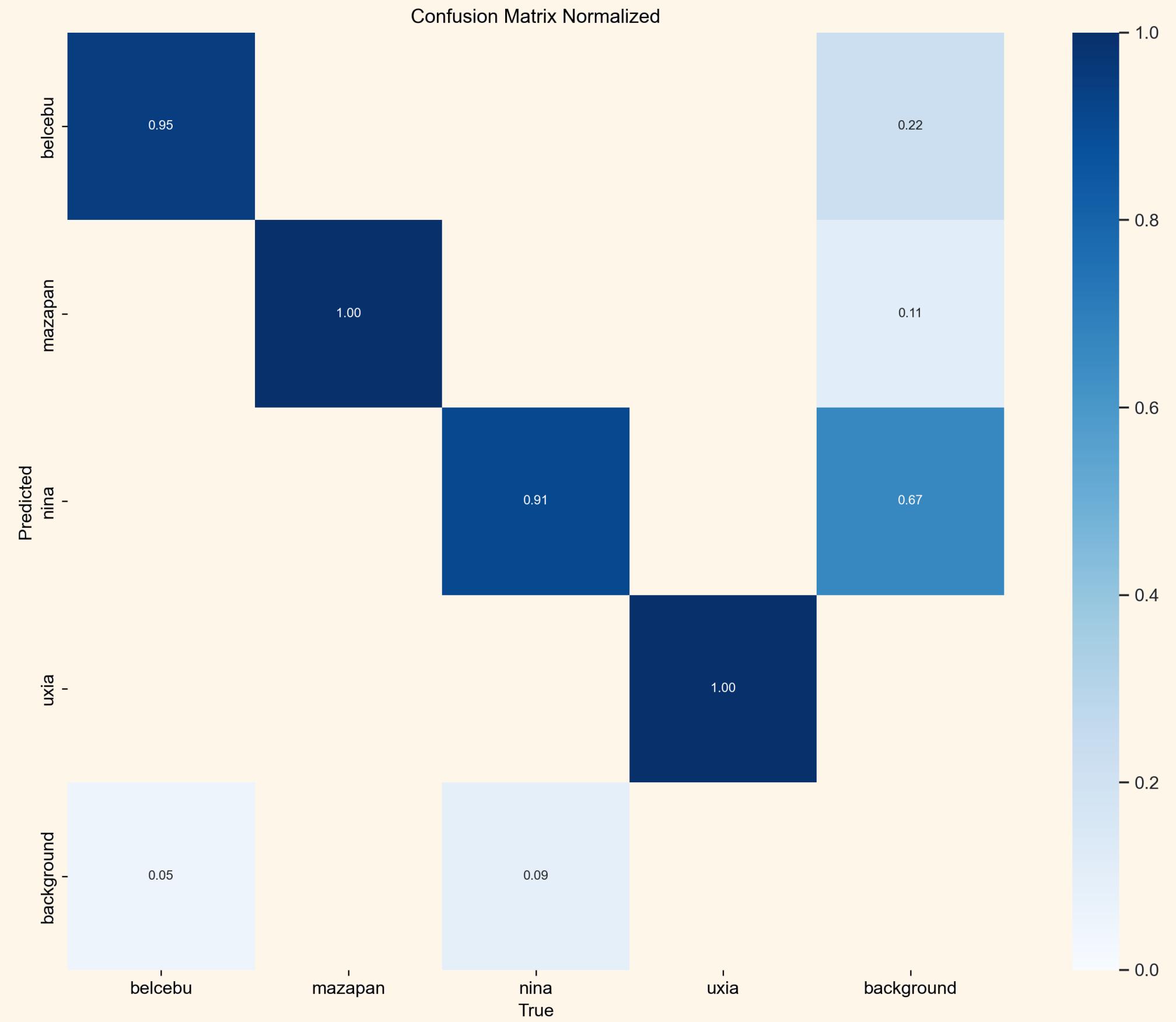
MODEL	PRECISION	RECALL	MAP*
MODEL 2	0.89286	0.8762	0.91065
MODEL 3	0.95367	0.90025	0.95593

*mAP (mean average precision)

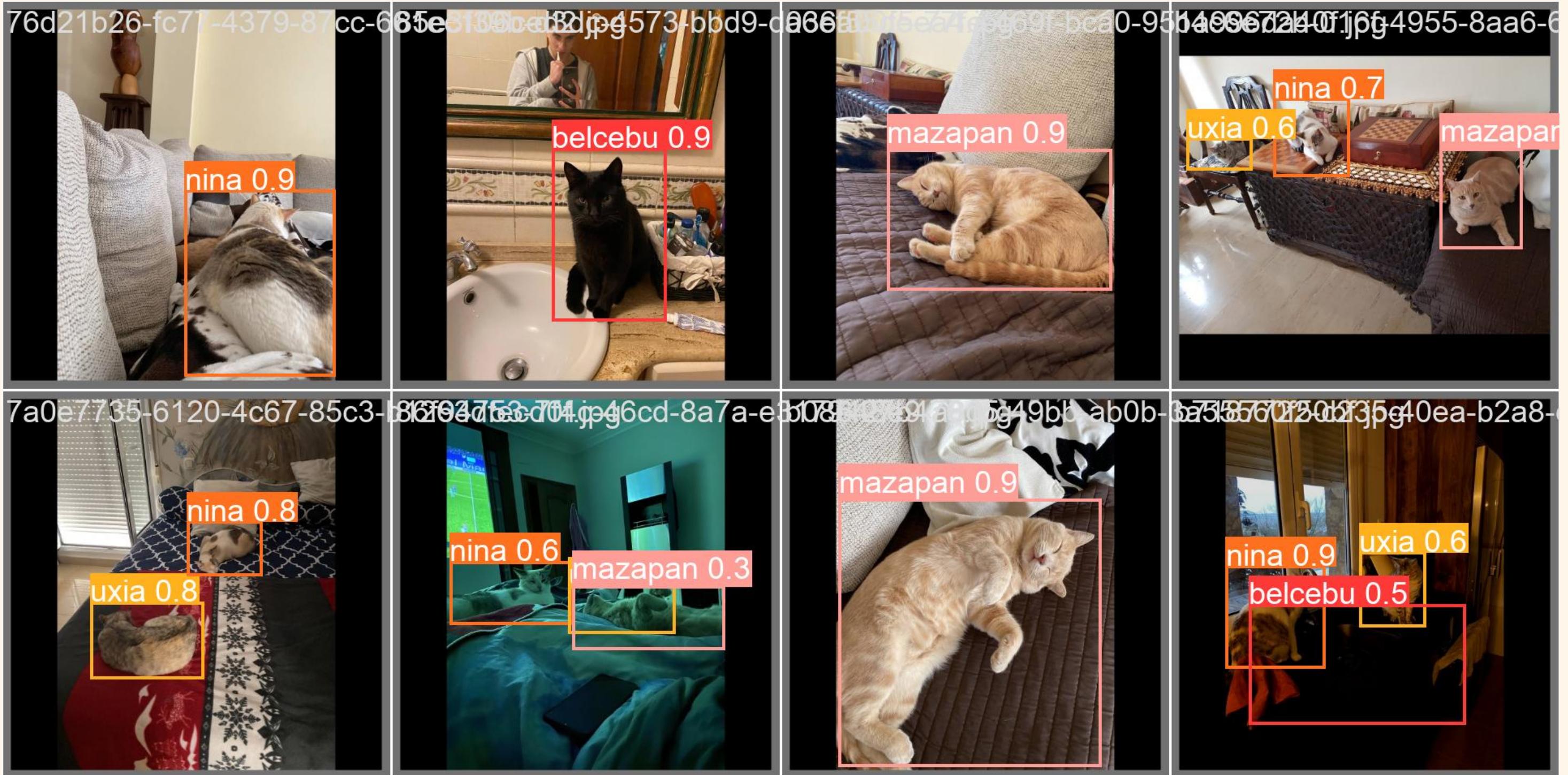
$$\text{Precision} = \text{TP} / (\text{TP} + \text{FP})$$

$$\text{Recall} = \text{TP} / (\text{TP} + \text{FN})$$

Model performance



Predictions



Challenges

- Keras didn't admit YOLO format. Had to transform to Keras format
- Keras is better for big datasets and makes it harder to work with small ones (lazy loading, tensors, etc)
- Imbalanced dataset
- Long feedback loop

More than photo detection



The use of a small model (nano) with
small inference times enables real time
detection ~30fps



A whimsical illustration featuring two cats and several paw prints. In the upper left, a dark brown cat is curled up, sleeping peacefully. In the lower center, a white cat with a light orange belly is also sleeping. Several large, stylized orange paw prints are scattered around the cats, some above them and others below. The background is a soft, light beige.

**Thank you for
your attention!**