Objects Detection (Rat)

Szu-Chi Huang
1 3 5 8 6 0 9

Course : cloud computing

Professor : Prof. Dr. Christian Baun

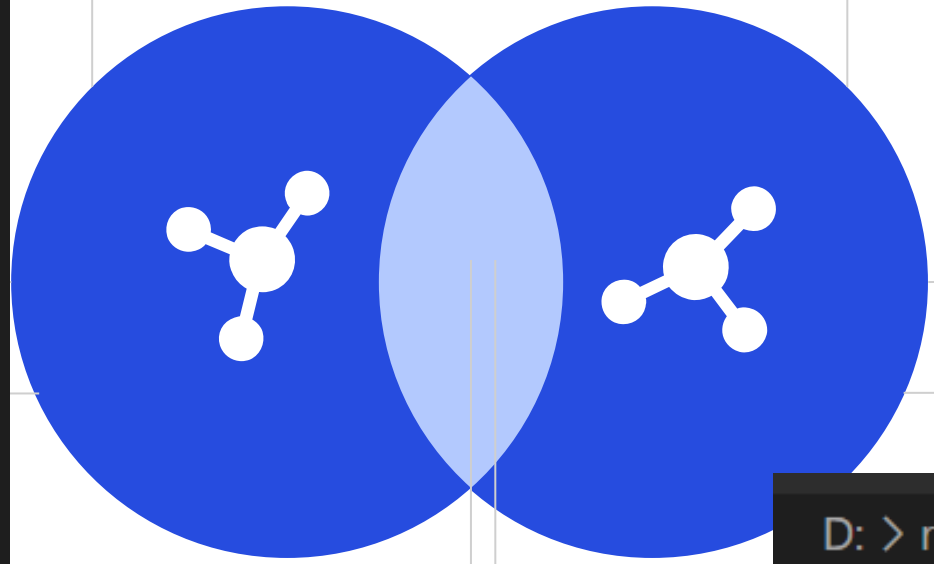
1. Data preparation
2. Training YOLO model
3. Results & validation
4. Prediction and results

Part one

Data preparation

Label

```yaml
train: data_images/train
val: data_images/test
nc: 20
names: ['person',
        'car',
        'chair',
        'bottle',
        'pottedplant',
        'bird',
        'dog',
        'sofa',
        'bicycle',
        'horse',
        'boat',
        'motorbike',
        'cat',
        'tvmonitor',
        'cow',
        'sheep',
        'aeroplane',
        'train',
        'diningtable',
        'bus'
]
```



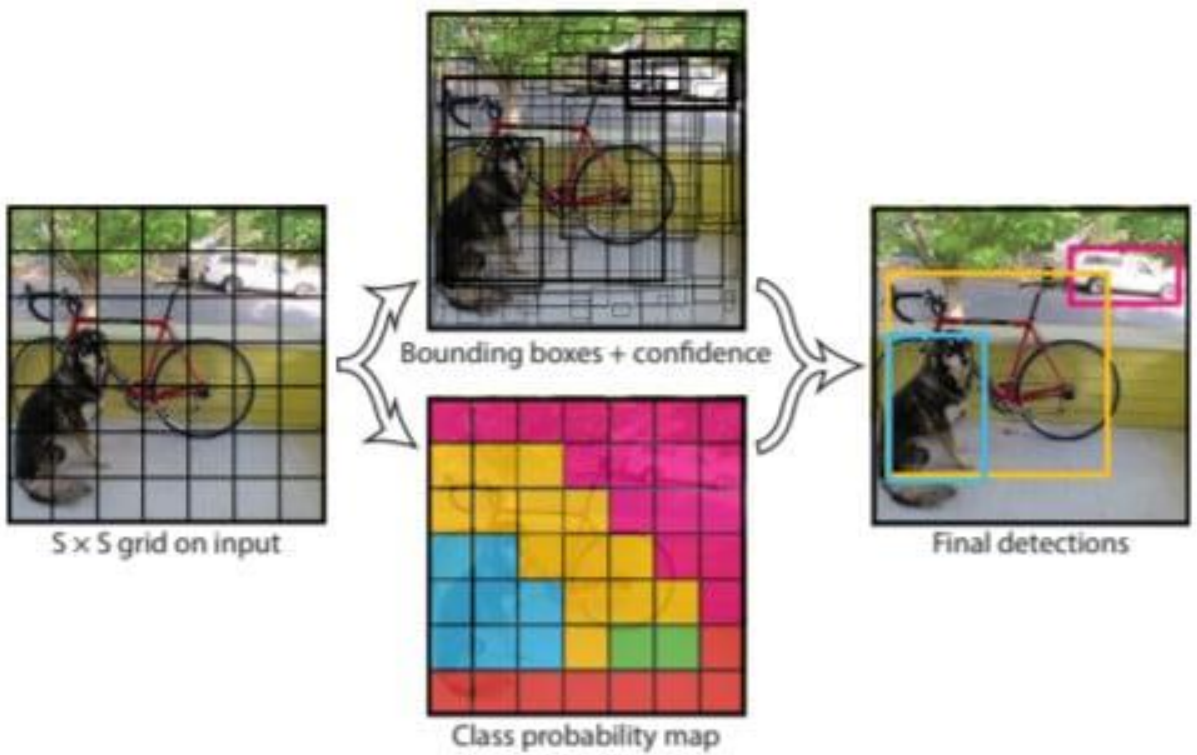
D: > ratDetection > ! data.yml

```yaml
train: pics/train
val: pics/test
nc: 1
names: ['rat']
```

Part two

Training YOLO model

YOLO model



- **Speed: This algorithm improves the speed of detection**
- **High accuracy: That provides accurate results with minimal background errors.**
- **Learning capabilities: learning capabilities enable it to learn the representations of objects and apply them in object detection.**

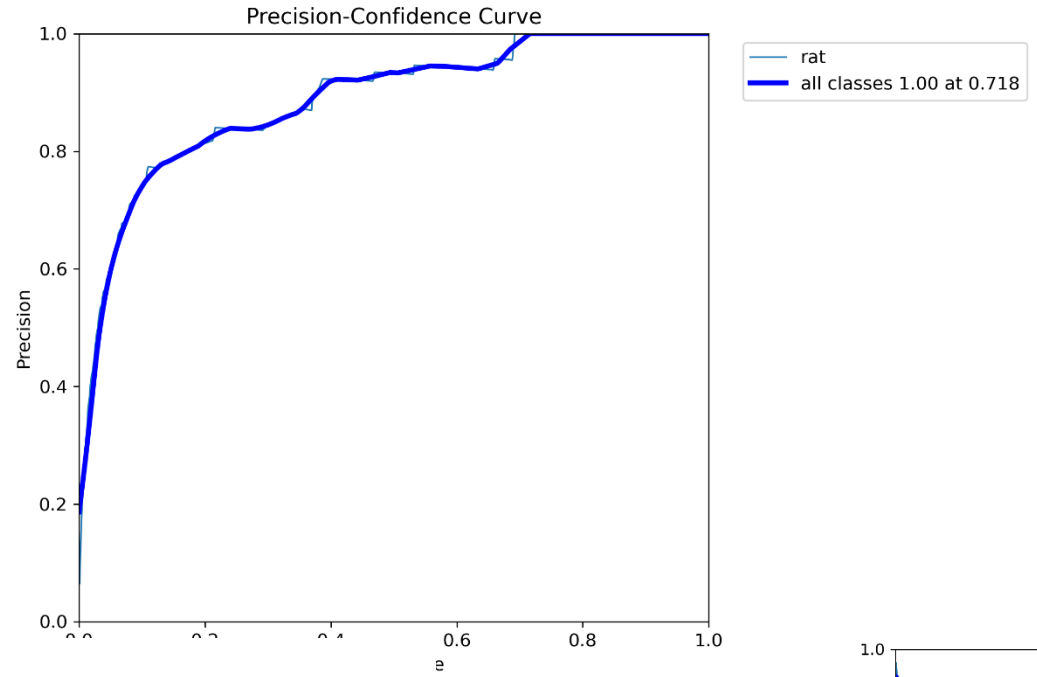
Part three

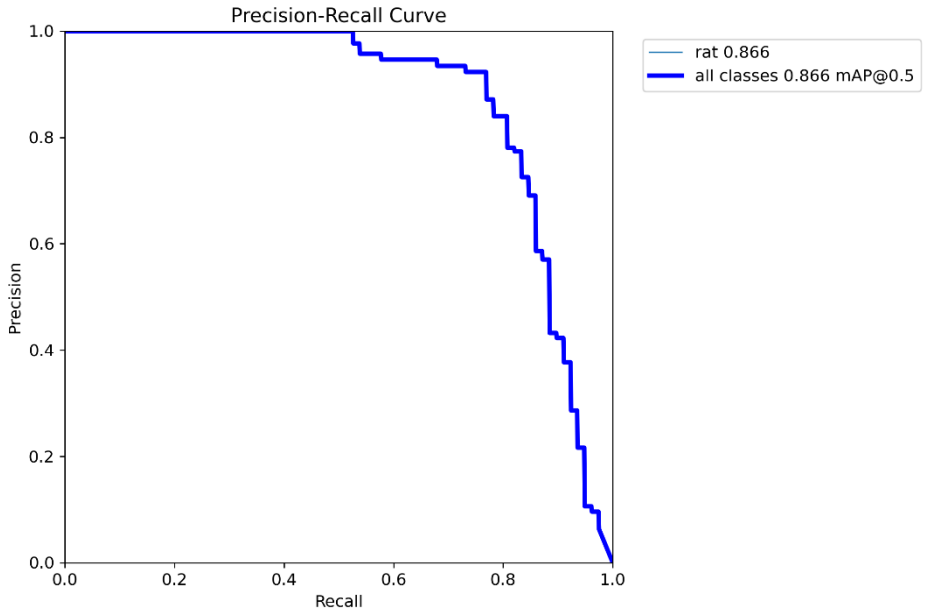
Results & validation

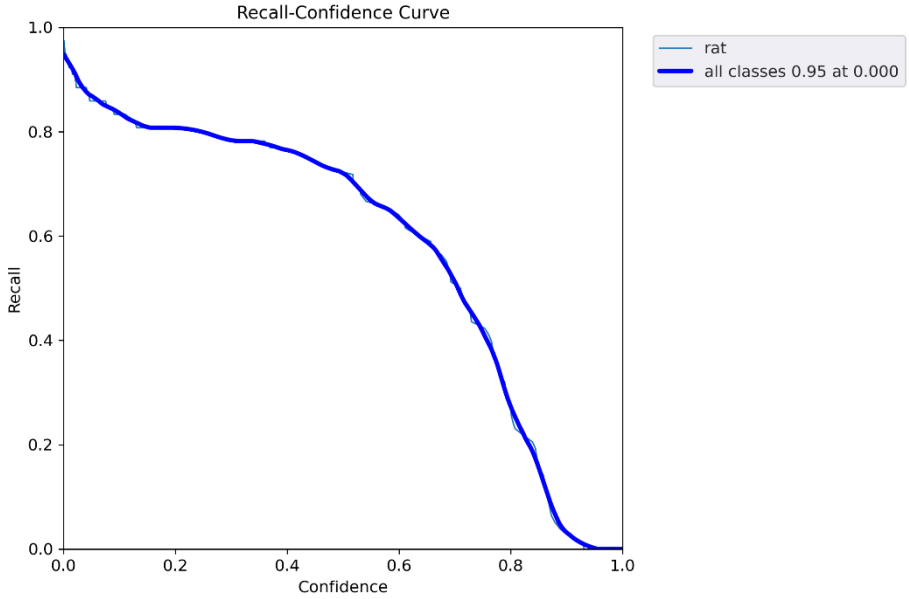
Precision recall

Precision represents the proportion of positive predictions that are actually correct.

Recall is an indicator of the completeness of the classifier's positive predictions.







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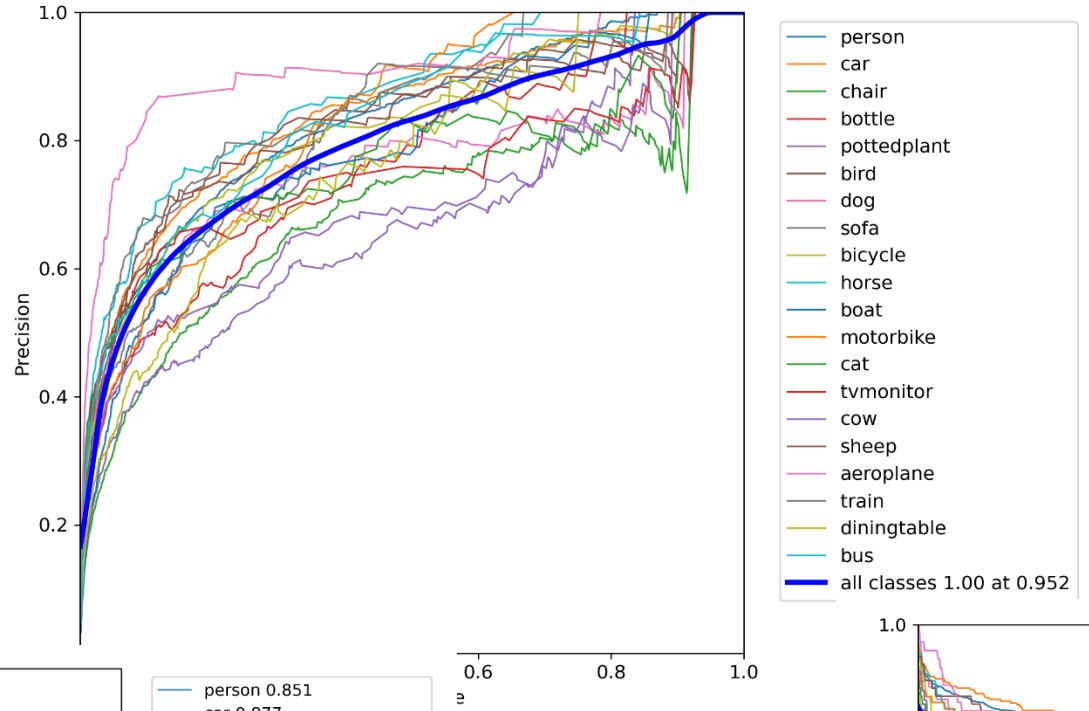
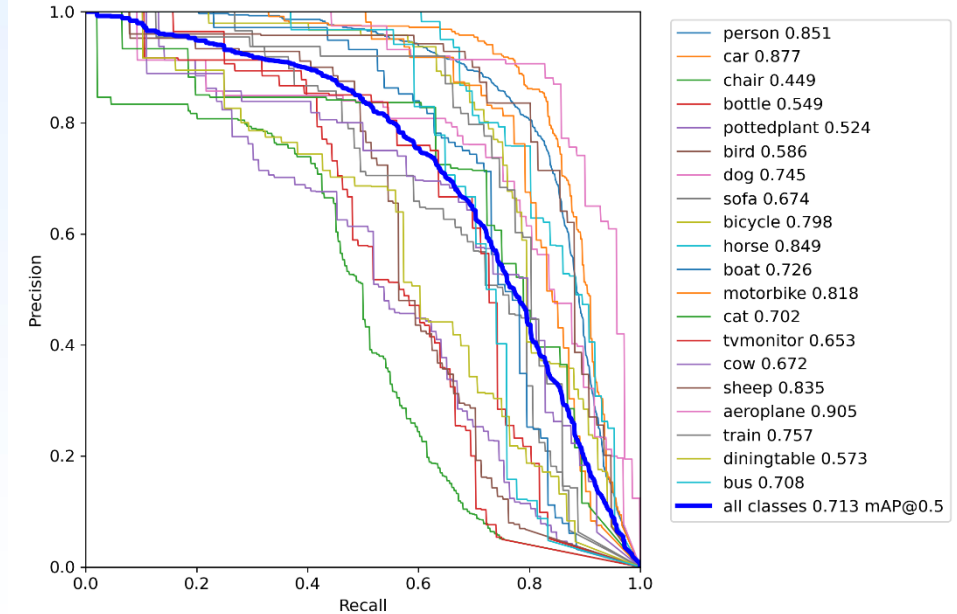
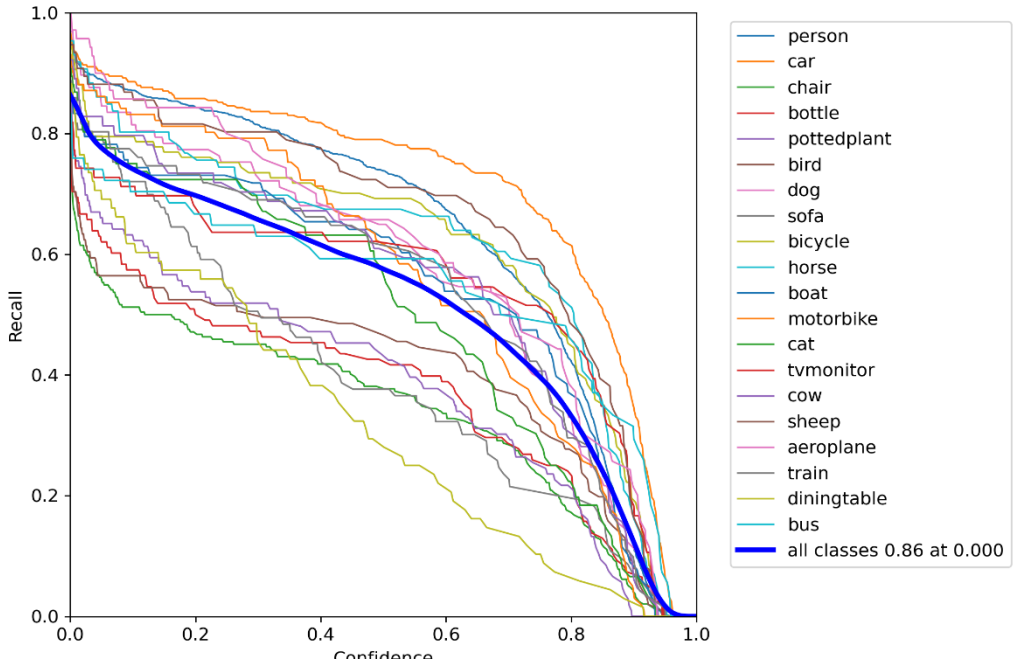
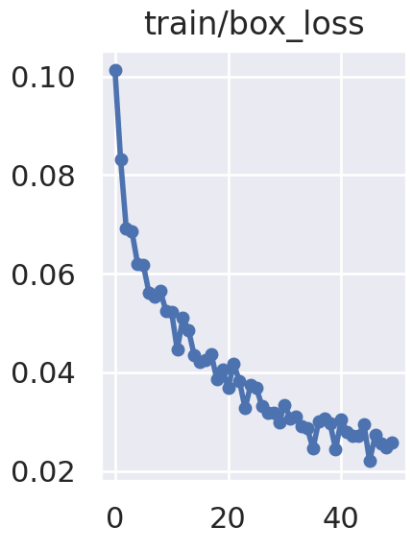
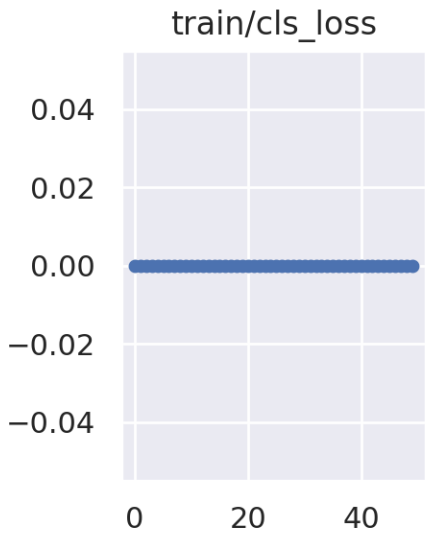


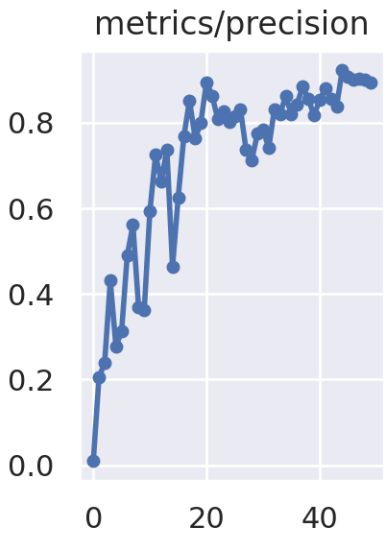


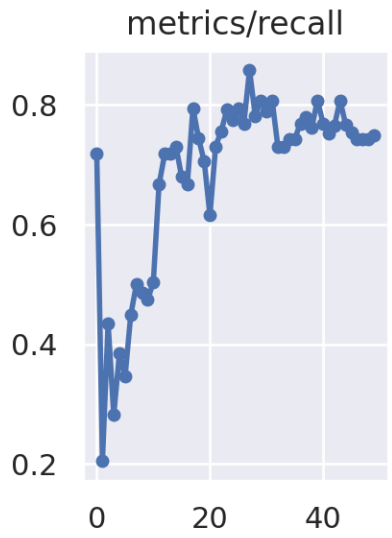


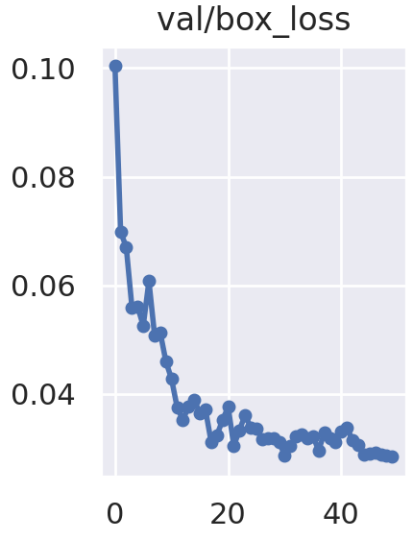
Validation results

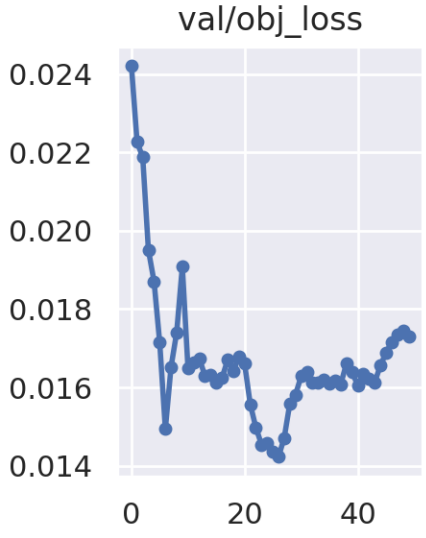


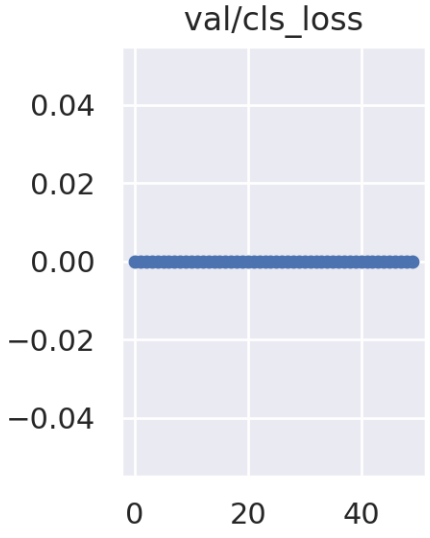


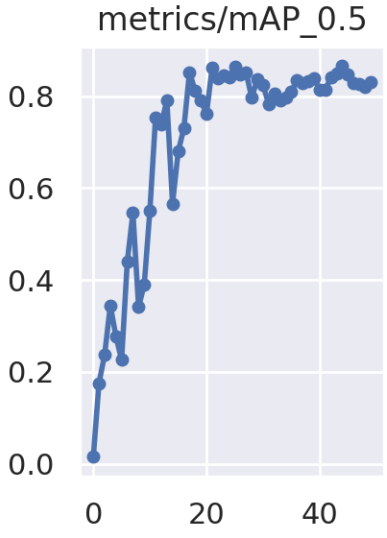


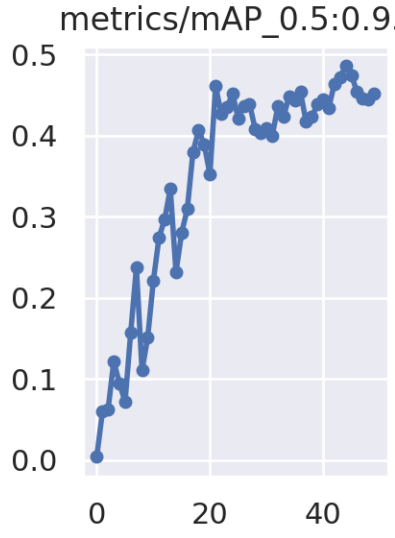






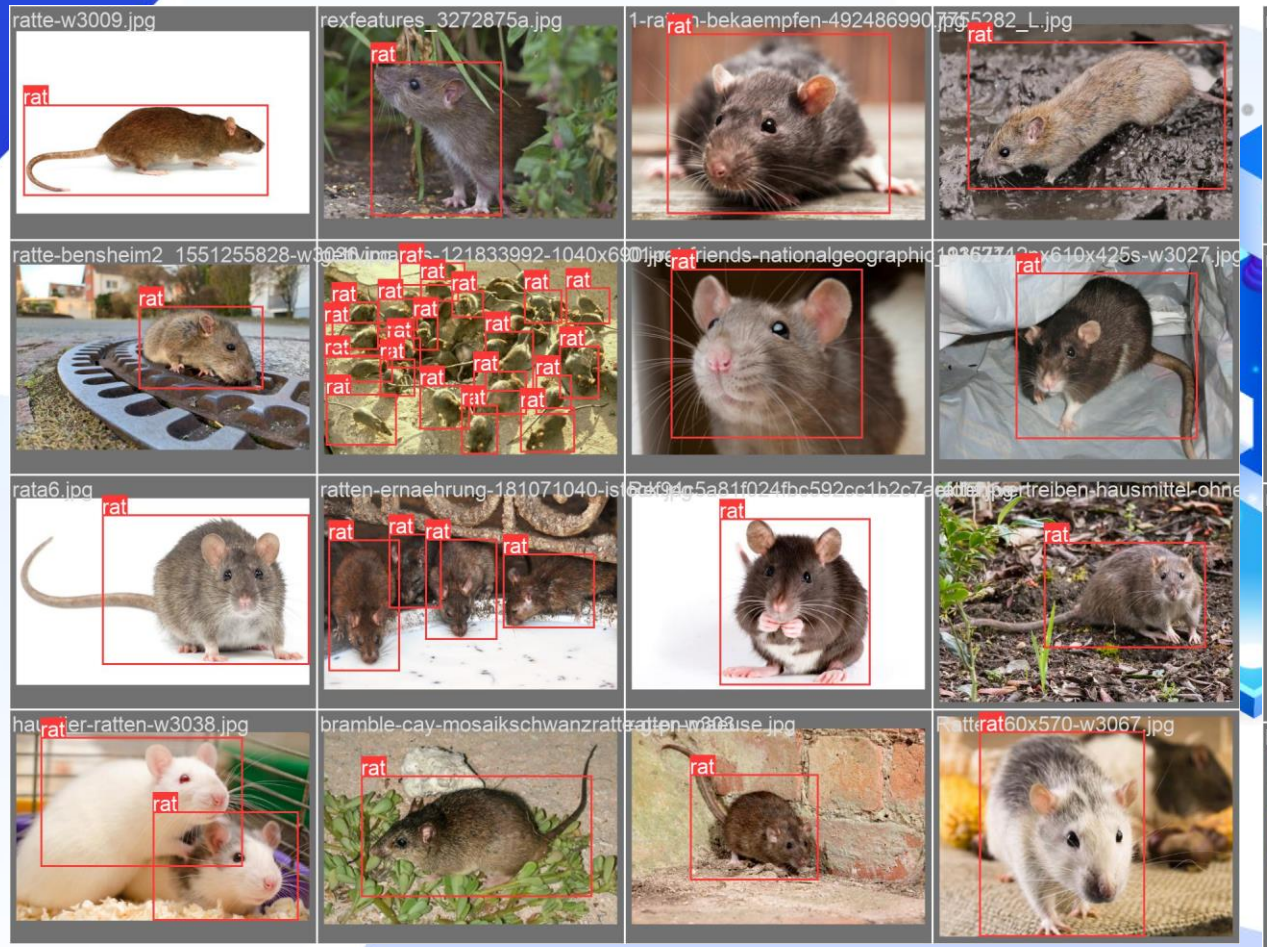






Validation results

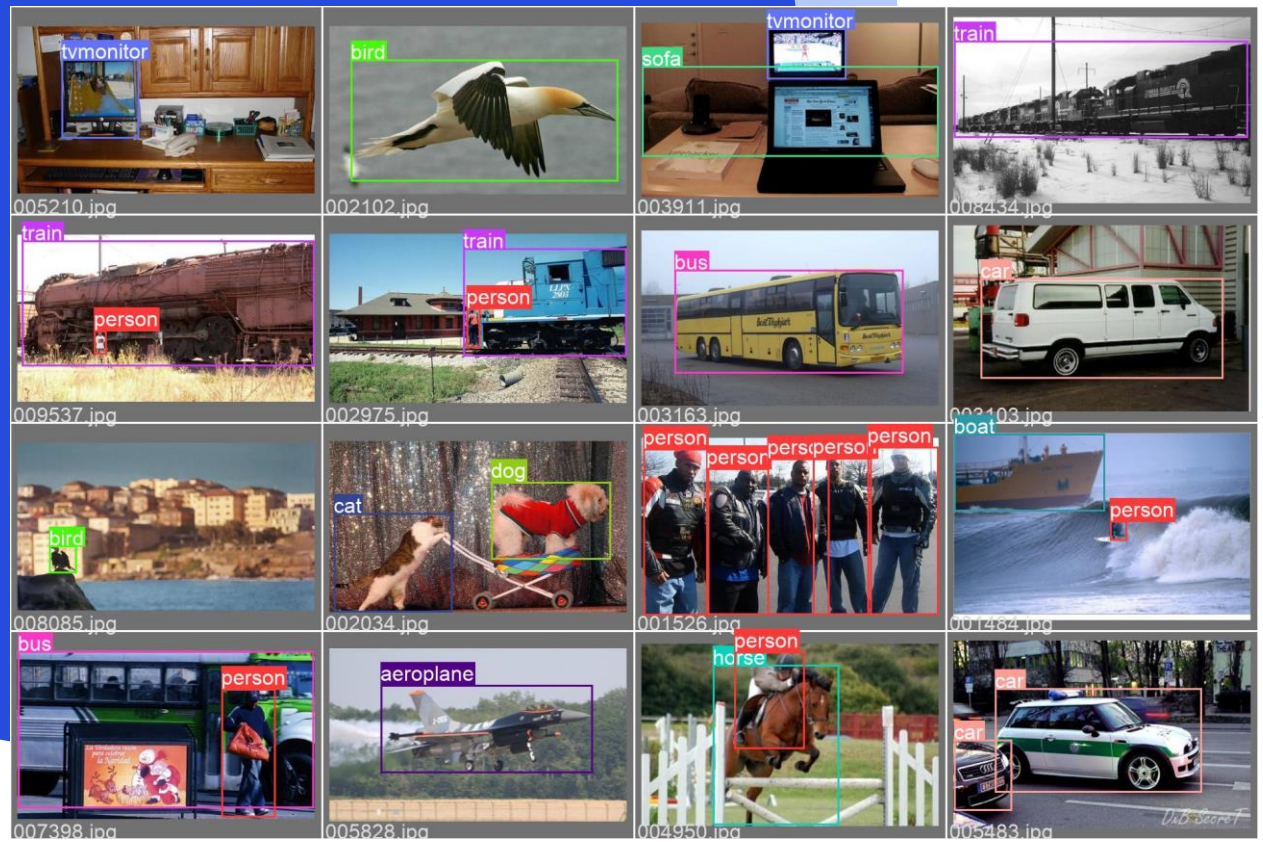
Actual



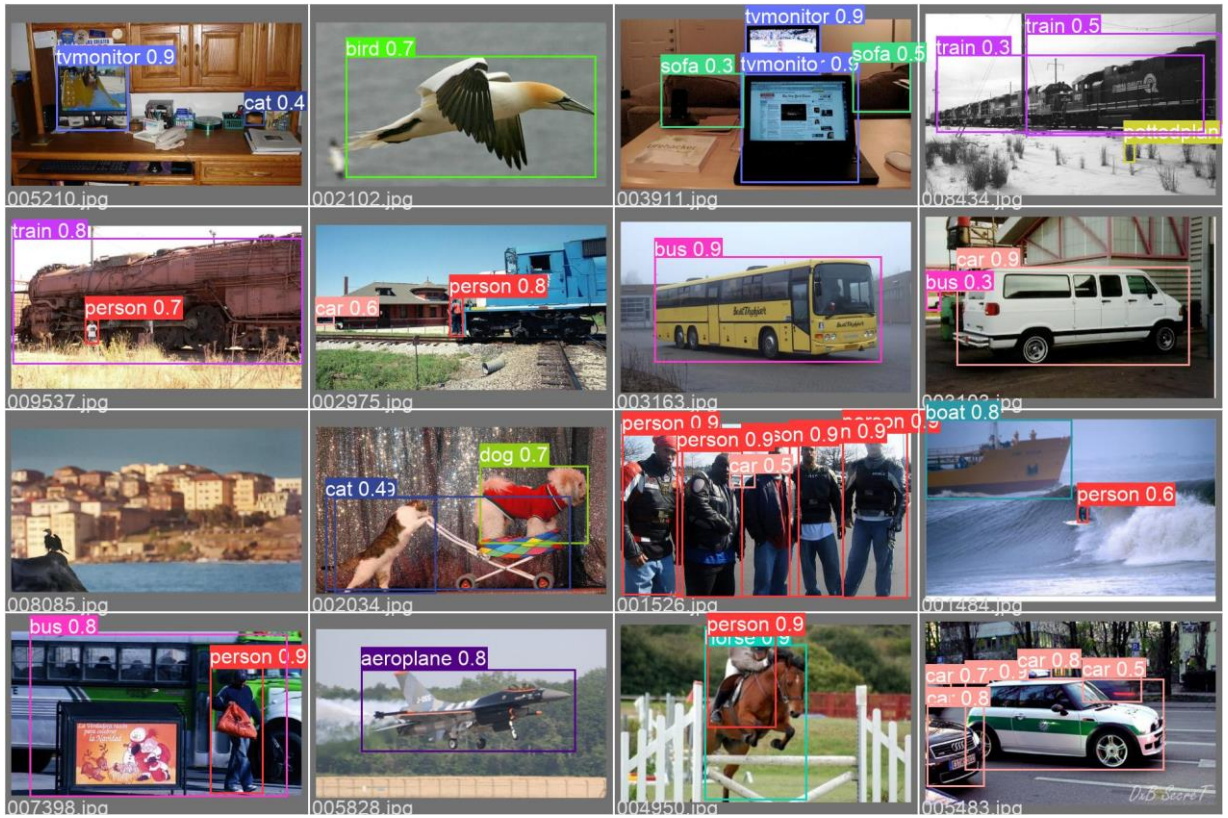
Prediction

Validation results

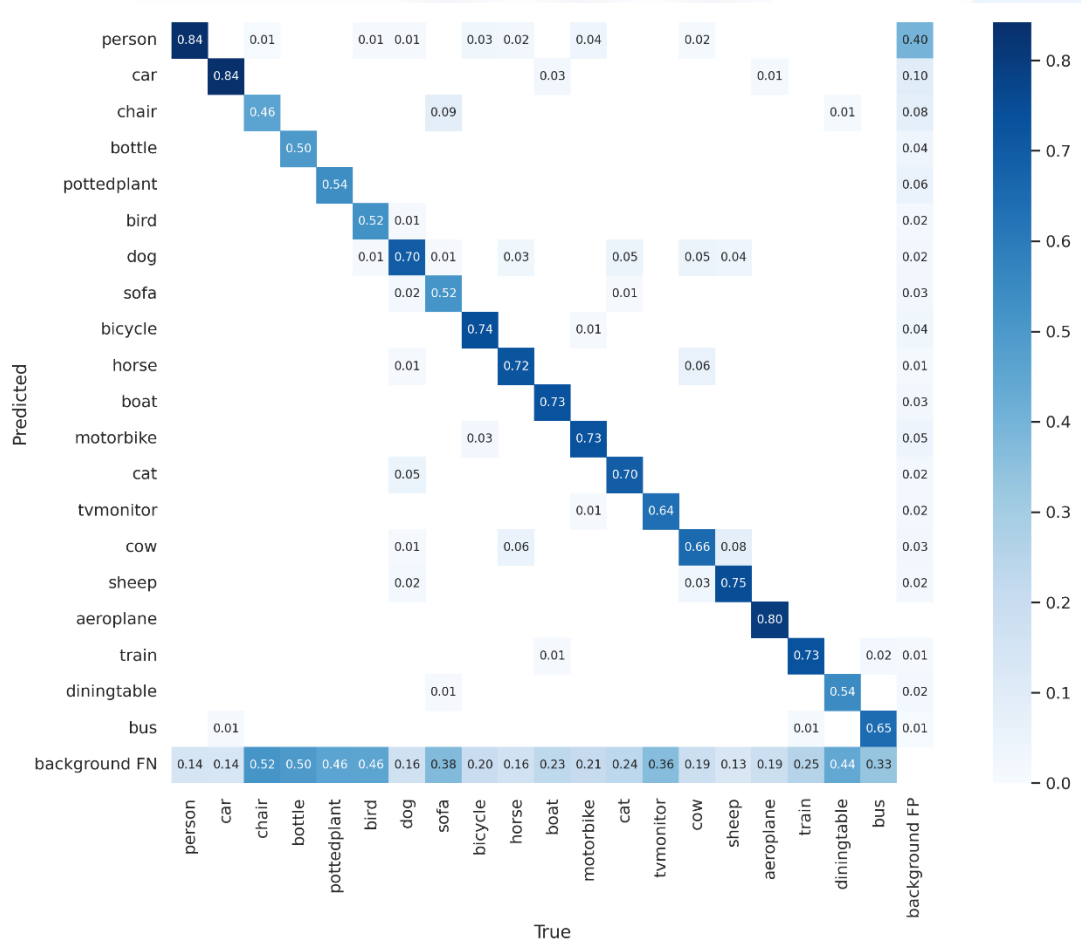
Actual



Prediction



Confusion matrix



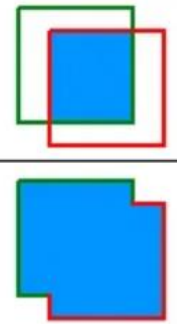
01

Intersection over Union (IoU)

$$\text{IoU} = \frac{\text{area}(gt \cap pd)}{\text{area}(gt \cup pd)}$$

02

$$IOU = \frac{\text{area of overlap}}{\text{area of union}} =$$

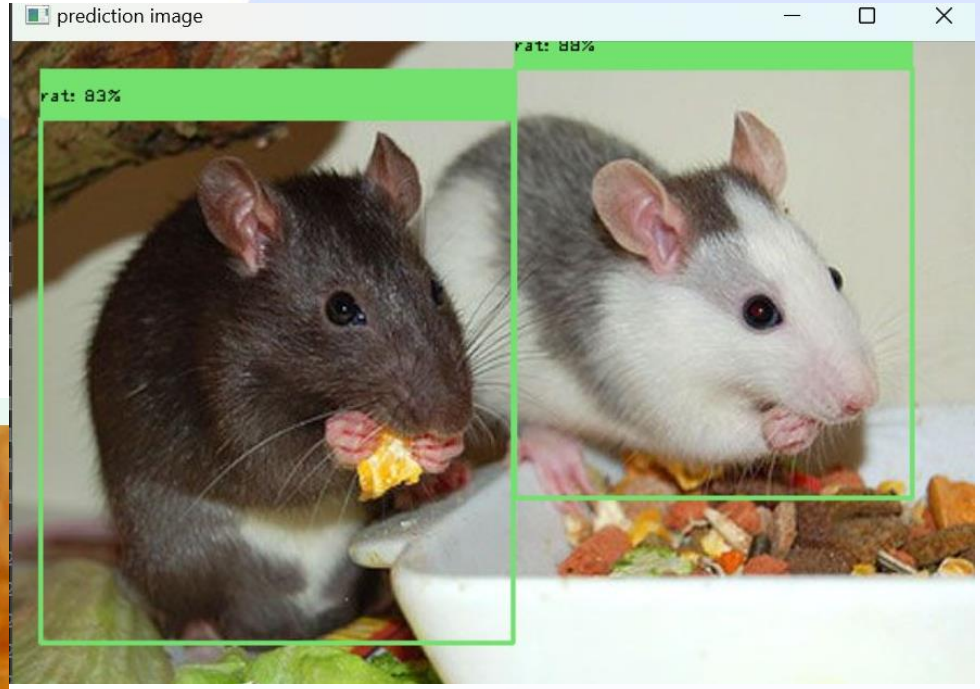


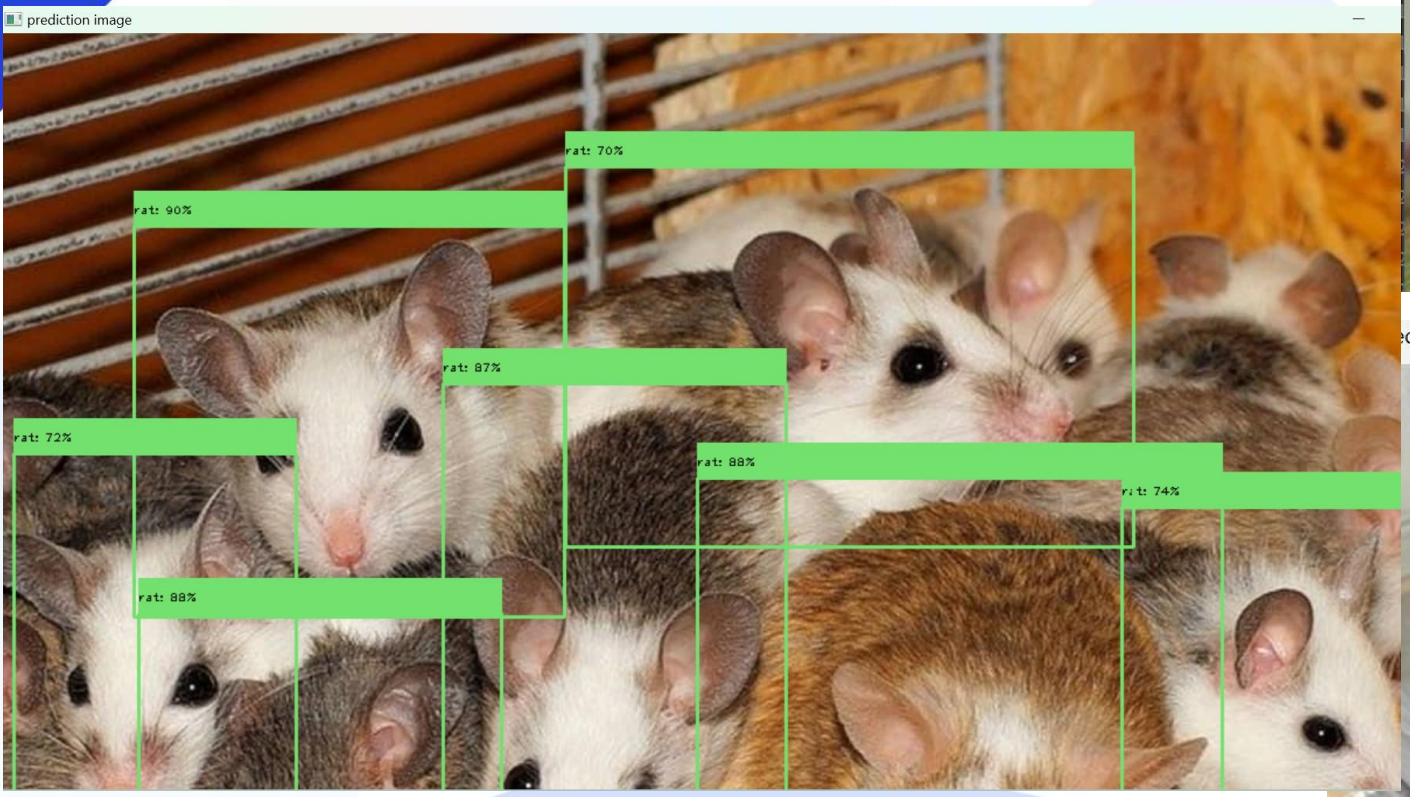
IoU metric ranges from 0 and 1

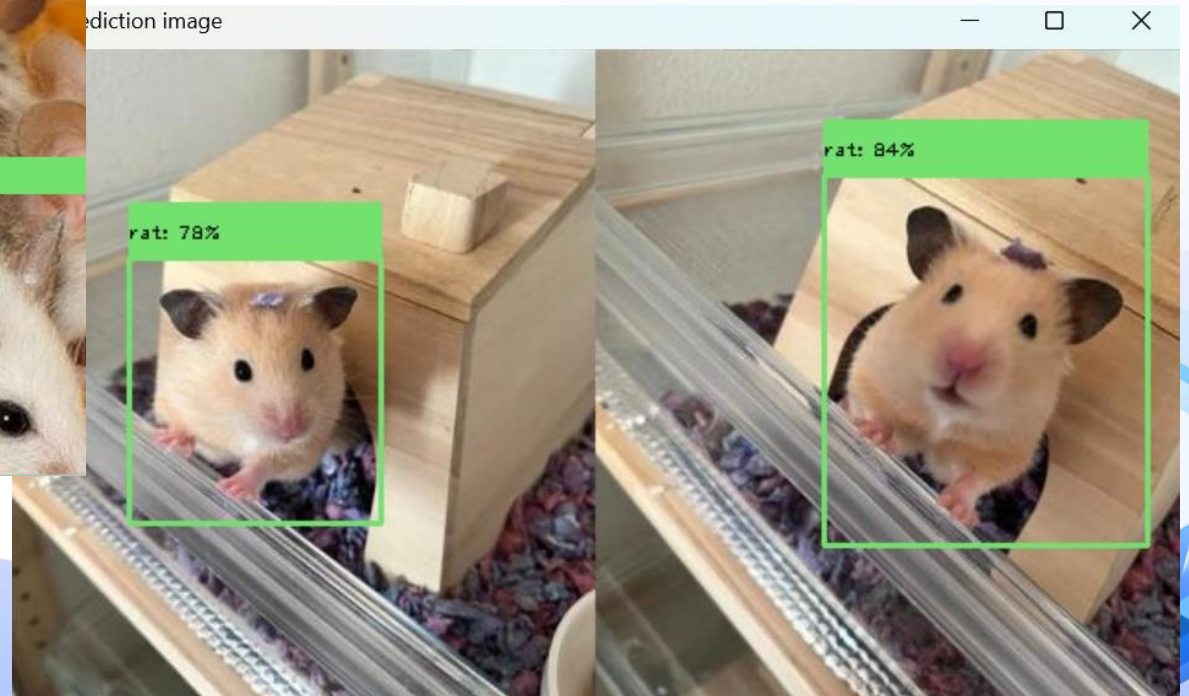
Part four

Prediction and results

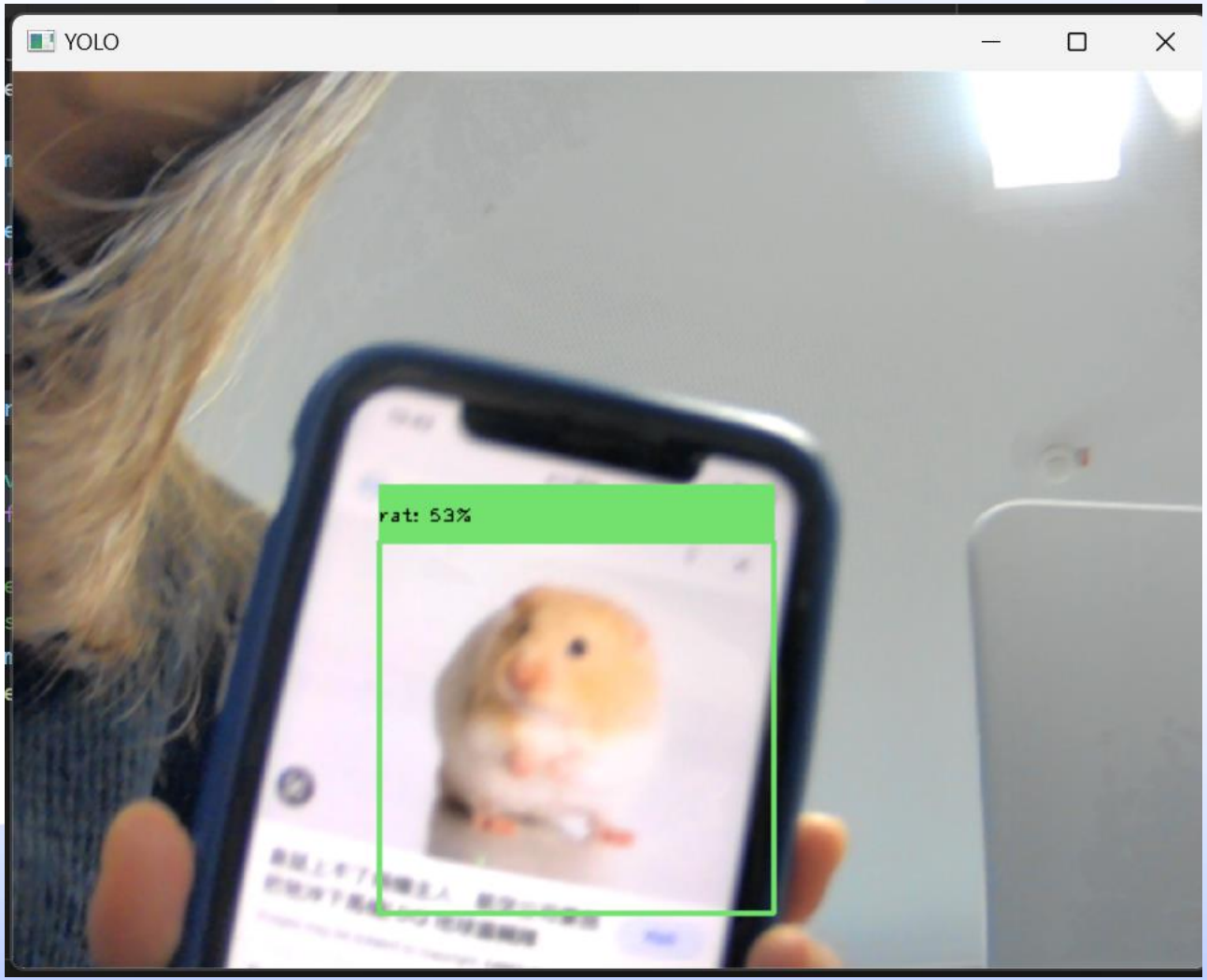
Rat detection



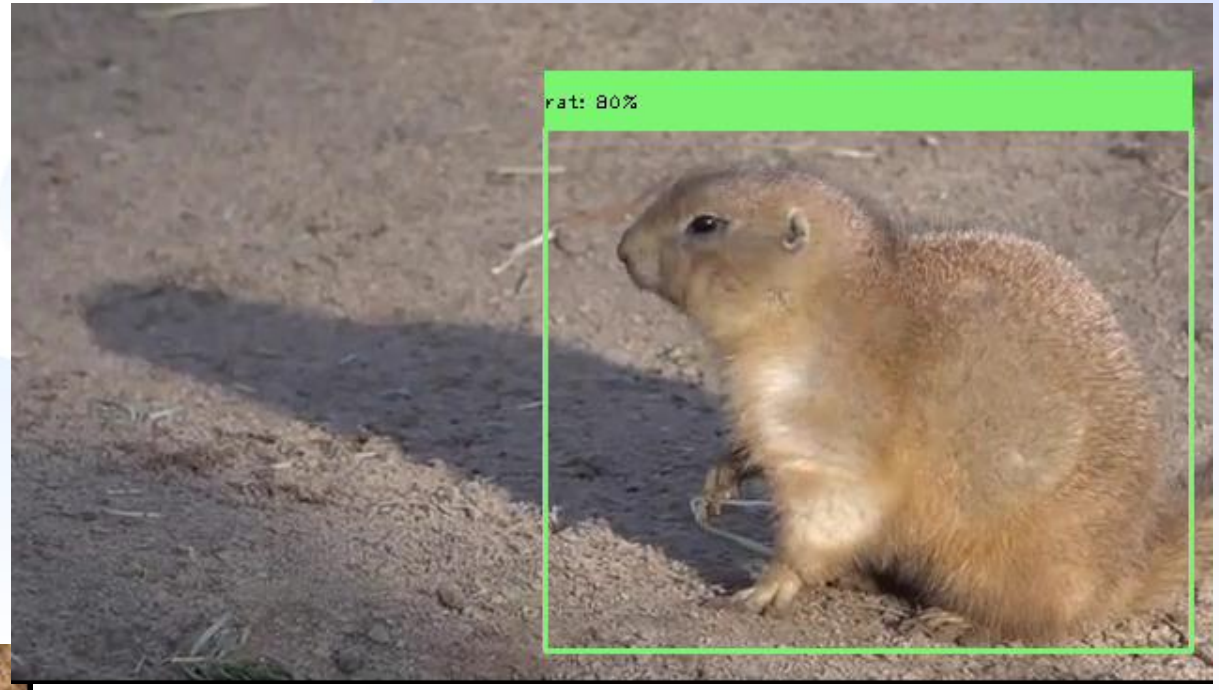


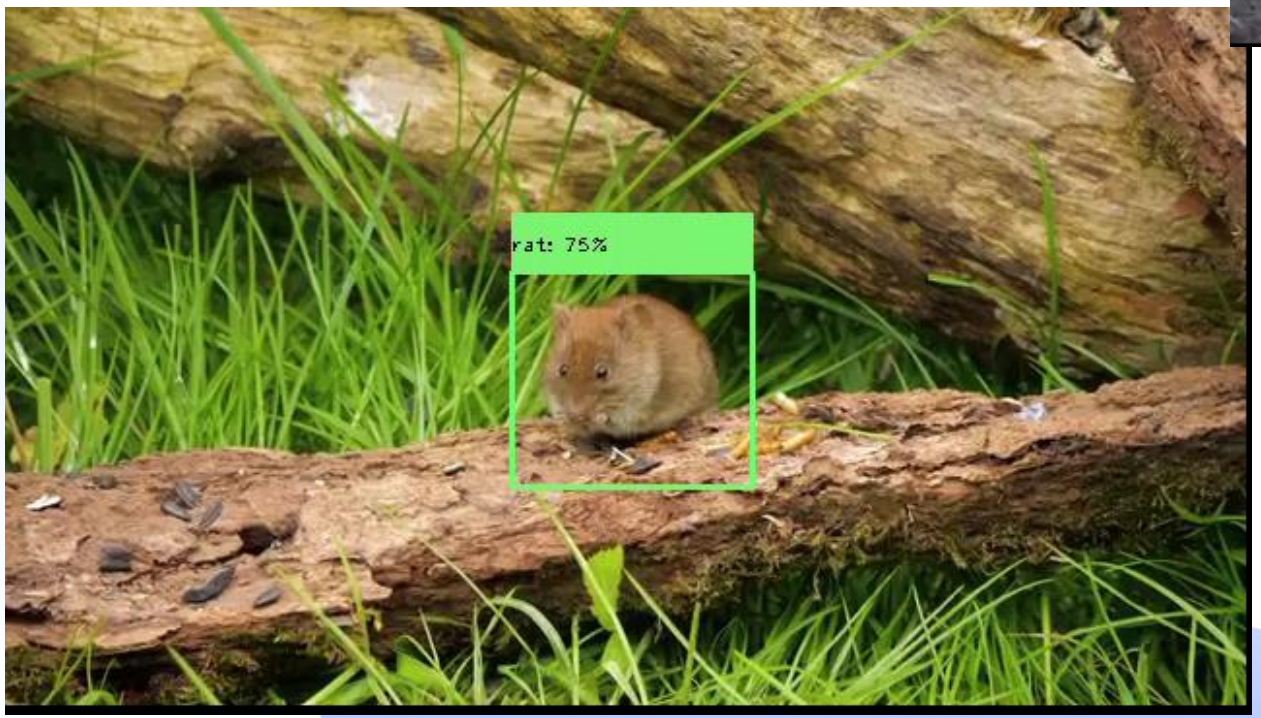


Rat detection

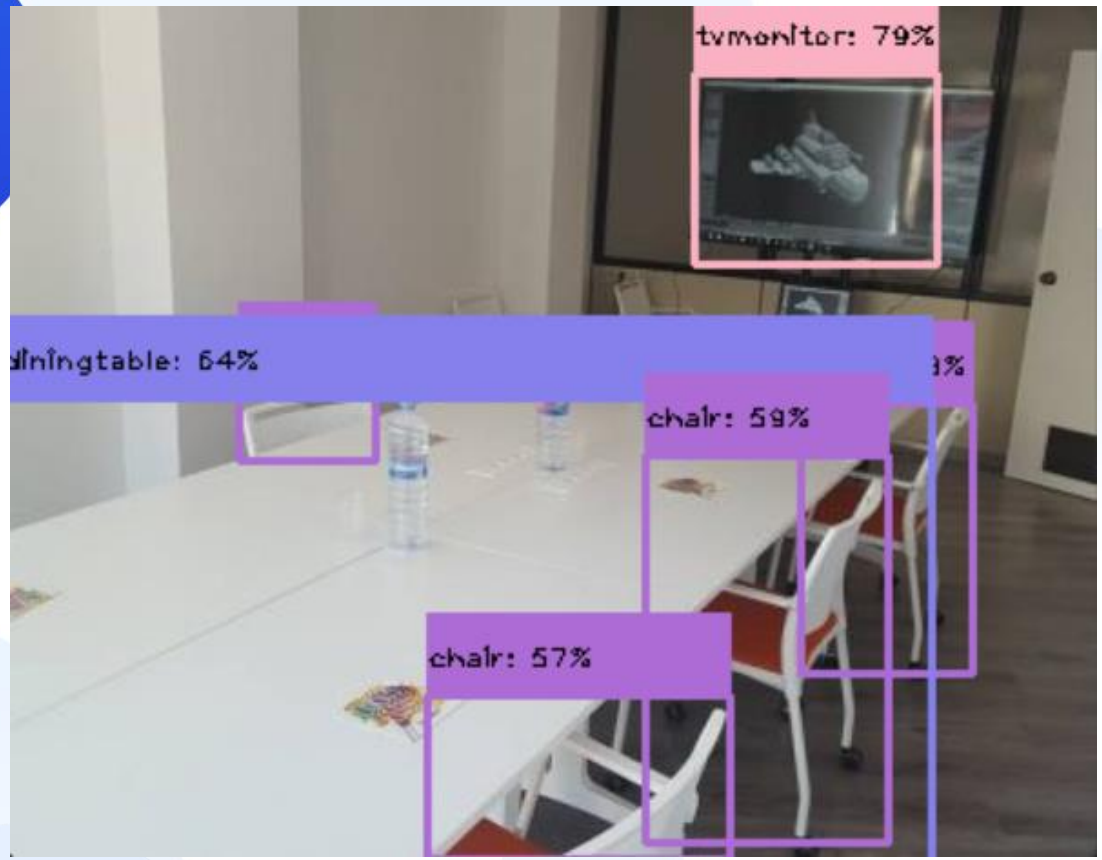


Rat detection





20 objects detection



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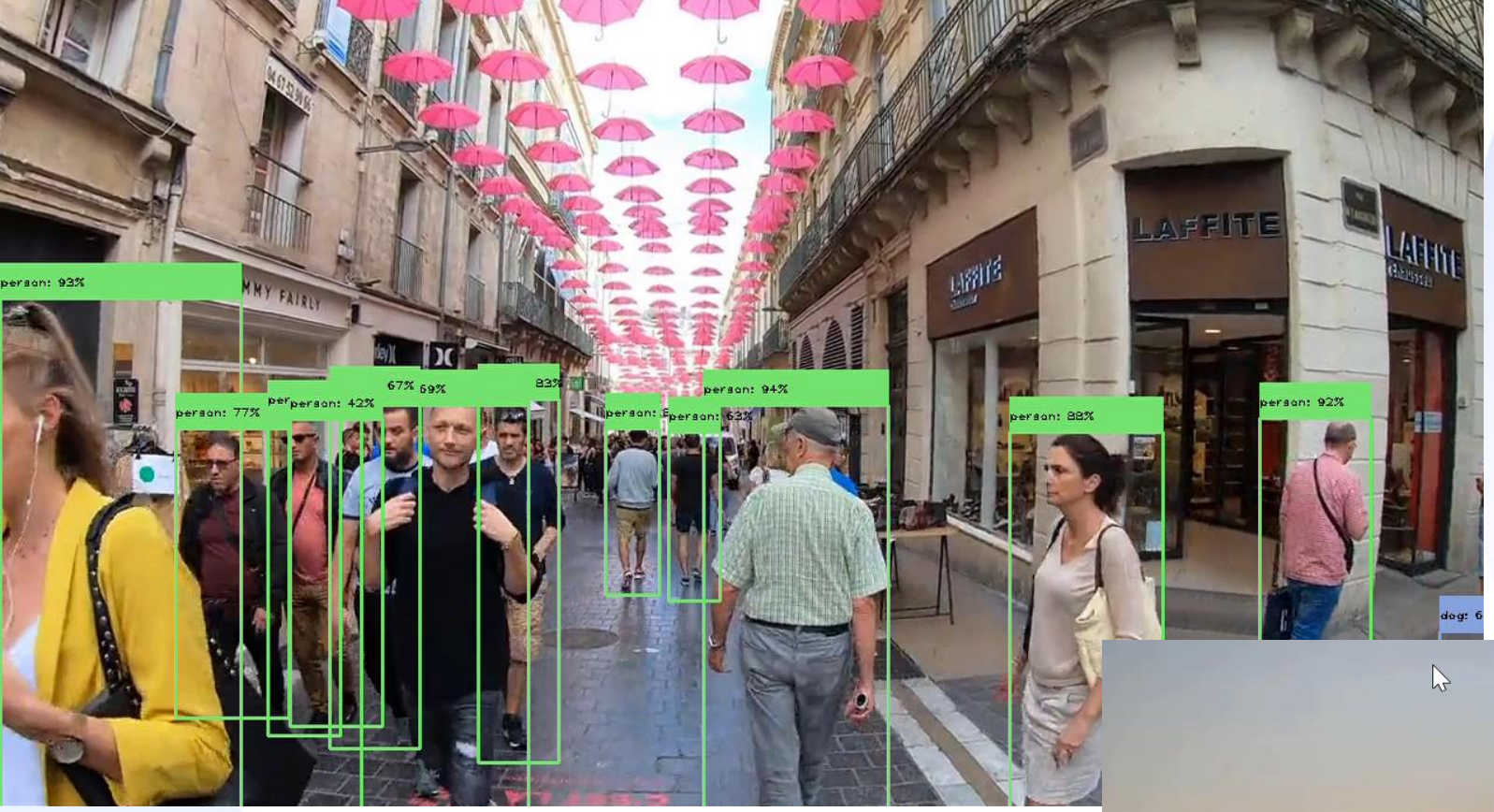

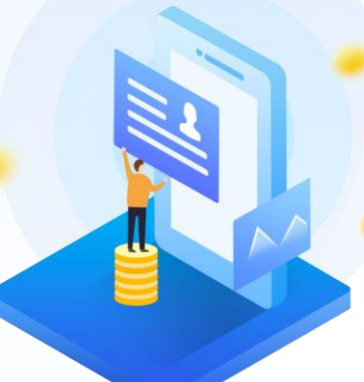

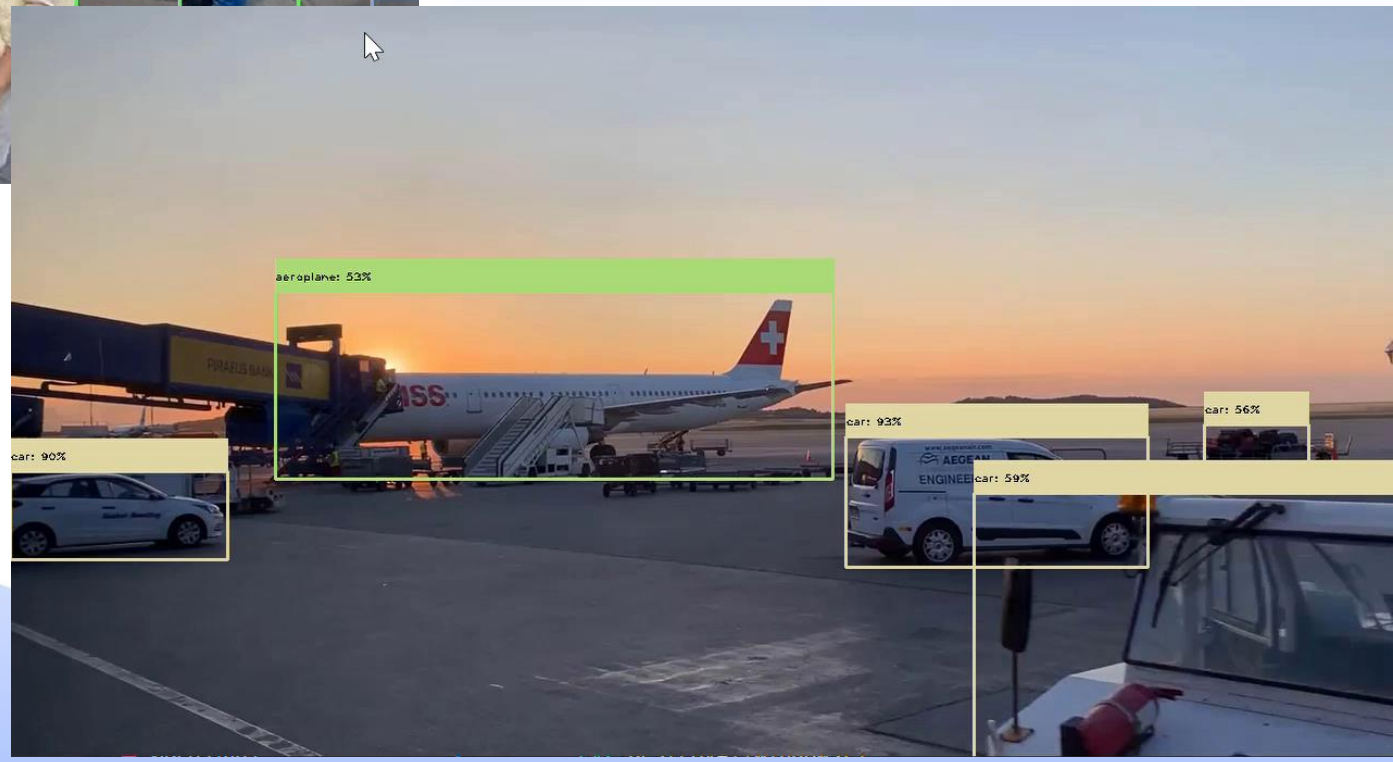

THANK YOU

Szu-Chi Huang