

Objects Detection (Rat)

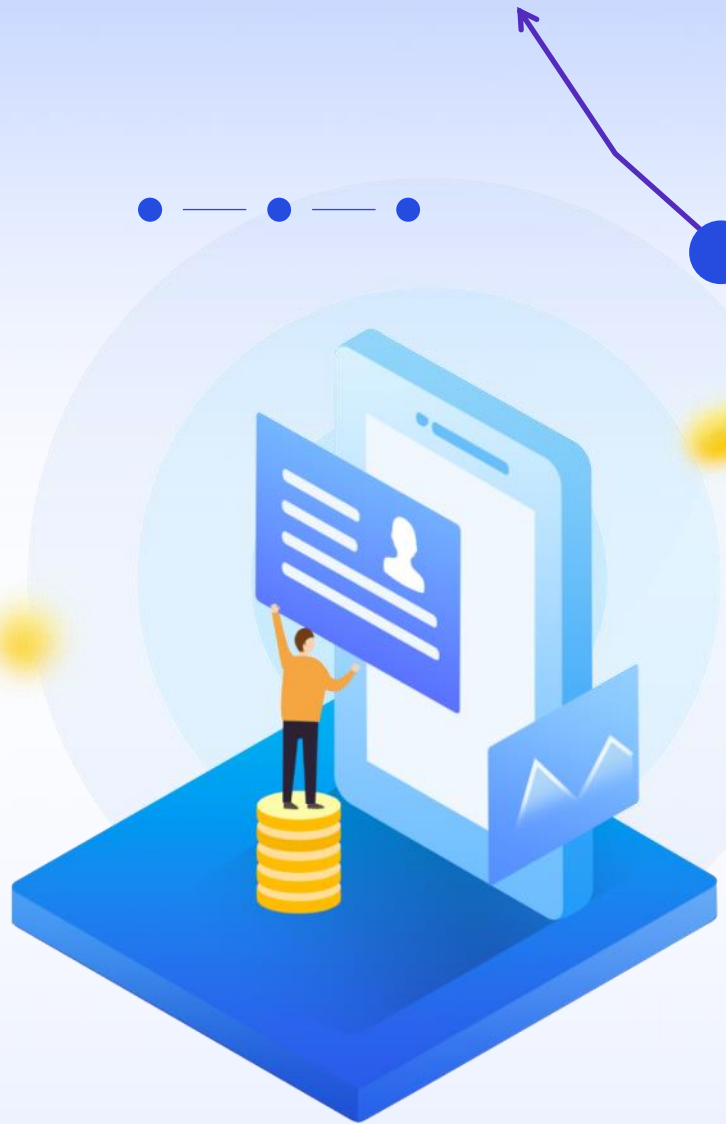


Szu-Chi Huang
1 3 5 8 6 0 9

Course : cloud computing

Professor : Prof. Dr. Christian Baun





1 Data preparation

2 Training YOLO model

3 Results & validation

4 Prediction and results



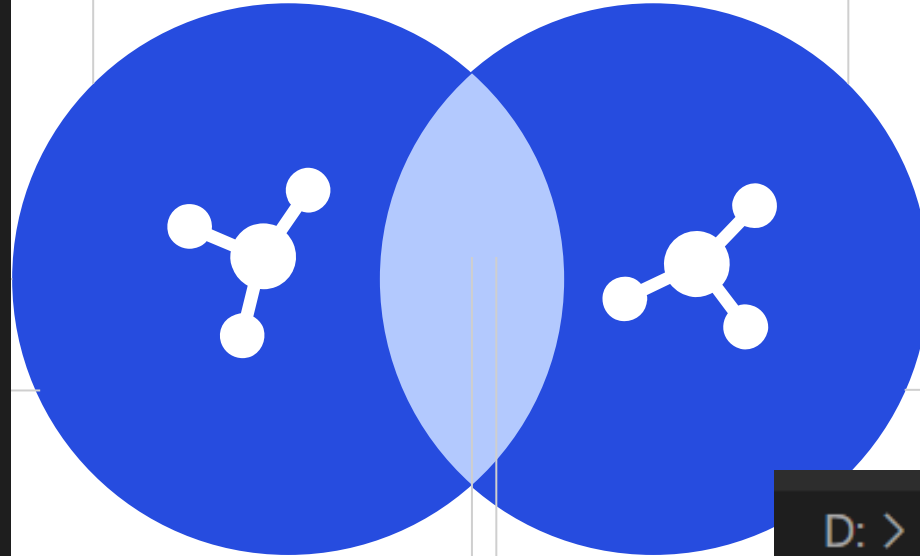
Part one

● Data preparation ●



Label

```
1 train: data_images/train
2 val: data_images/test
3 nc: 20
4 names: ['person',
5         'car',
6         'chair',
7         'bottle',
8         'pottedplant',
9         'bird',
10        'dog',
11        'sofa',
12        'bicycle',
13        'horse',
14        'boat',
15        'motorbike',
16        'cat',
17        'tvmonitor',
18        'cow',
19        'sheep',
20        'aeroplane',
21        'train',
22        'diningtable',
23        'bus'
24 ]
```



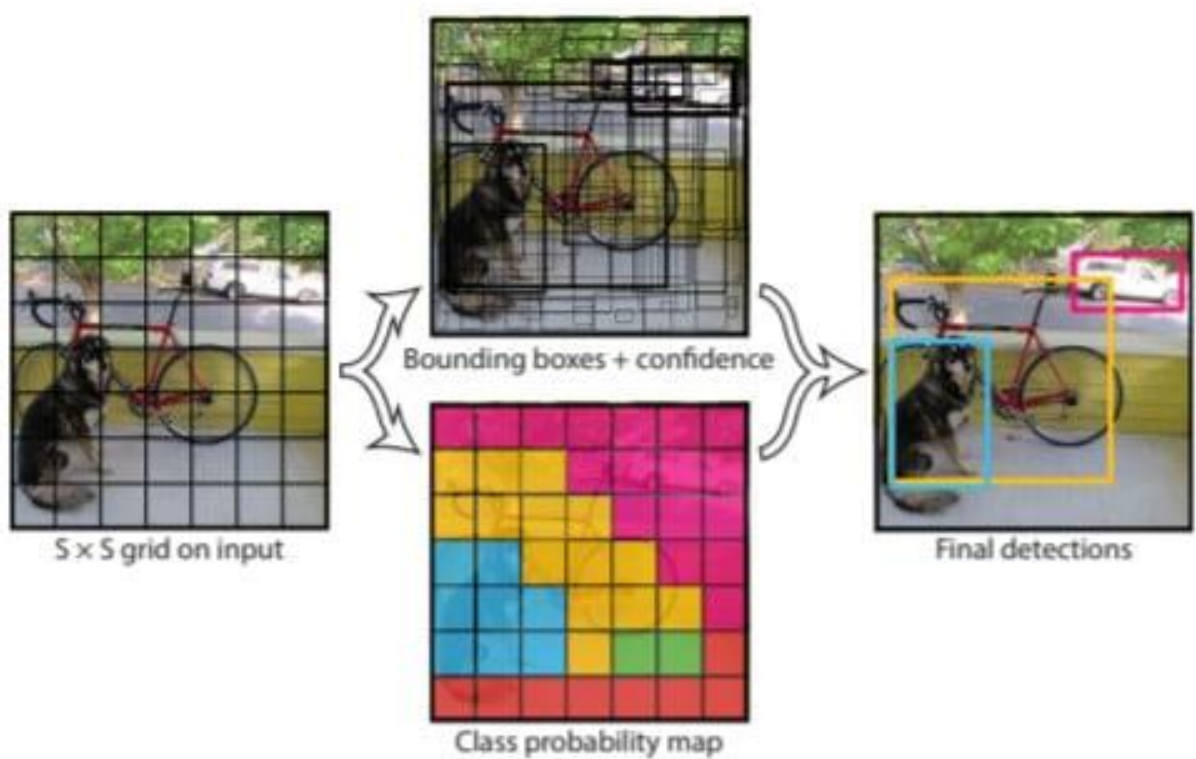
```
D: > ratDetection > ! data.yml
1 train: pics/train
2 val: pics/test
3 nc: 1
4 names: ['rat']
```



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.

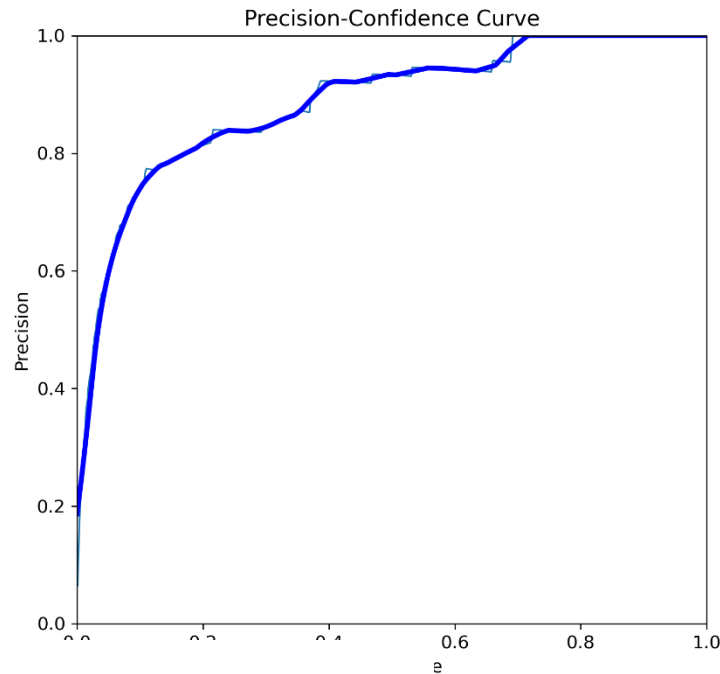


Part three

● Results & validation ●



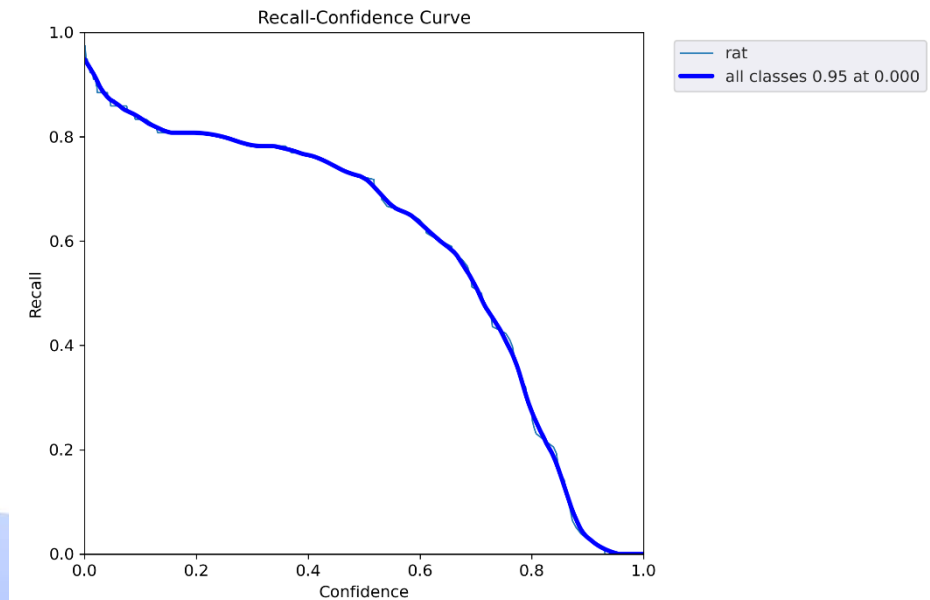
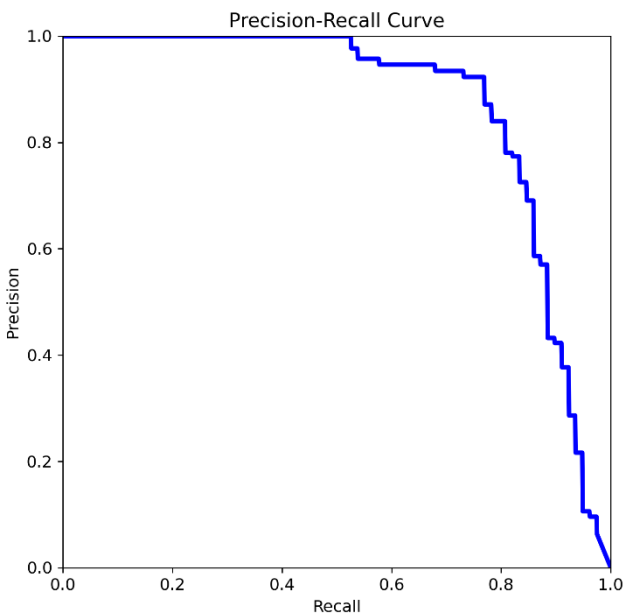
Precision recall



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

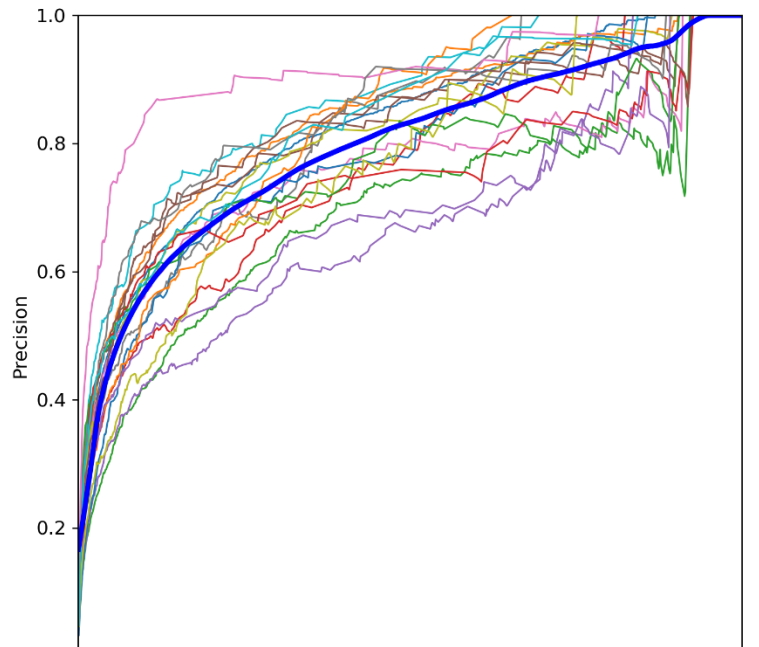


Recall is an indicator of the completeness of the classifier's positive predictions.





Precision recall

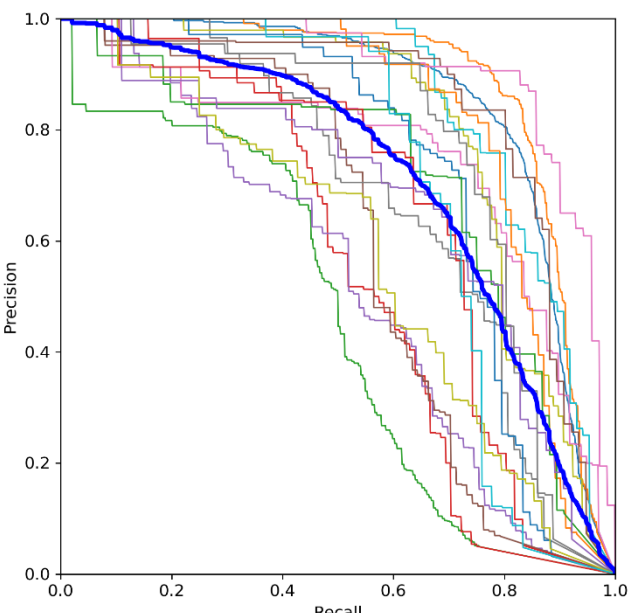


- person
- car
- chair
- bottle
- pottedplant
- bird
- dog
- sofa
- bicycle
- horse
- boat
- motorbike
- cat
- tvmonitor
- cow
- sheep
- aeroplane
- train
- diningtable
- bus
- all classes 1.00 at 0.952

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

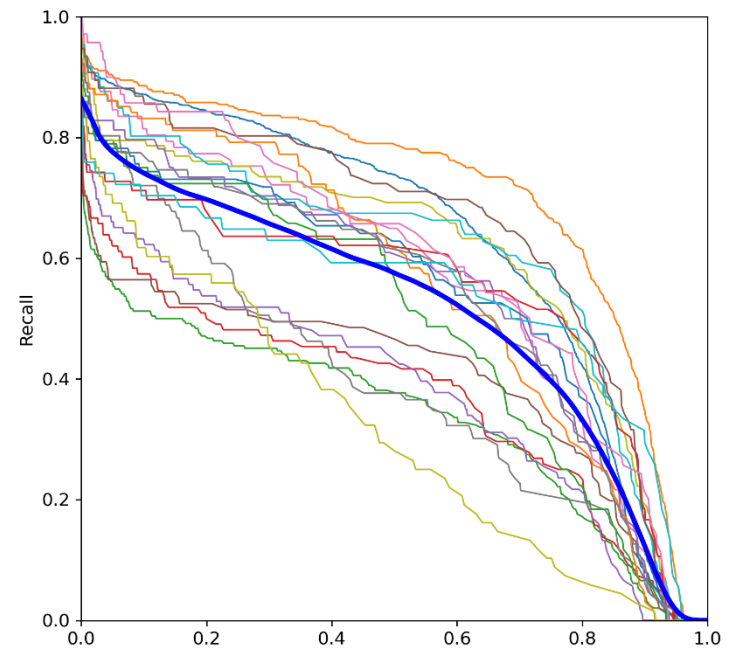


Recall is an indicator of the completeness of the classifier's positive predictions.



- person 0.851
- car 0.877
- chair 0.449
- bottle 0.549
- pottedplant 0.524
- bird 0.586
- dog 0.745
- sofa 0.674
- bicycle 0.798
- horse 0.849
- boat 0.726
- motorbike 0.818
- cat 0.702
- tvmonitor 0.653
- cow 0.672
- sheep 0.835
- aeroplane 0.905
- train 0.757
- diningtable 0.573
- bus 0.708
- all classes 0.713 mAP@0.5

0.6 0.8 1.0

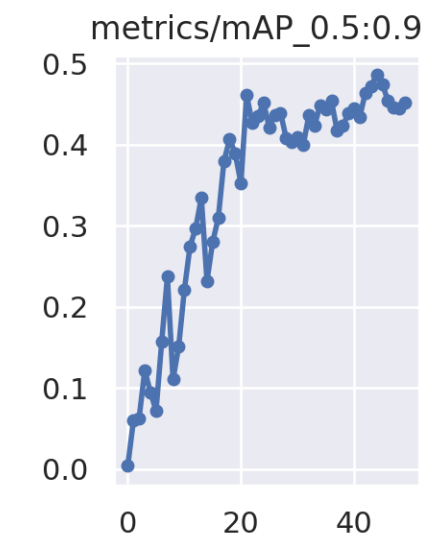
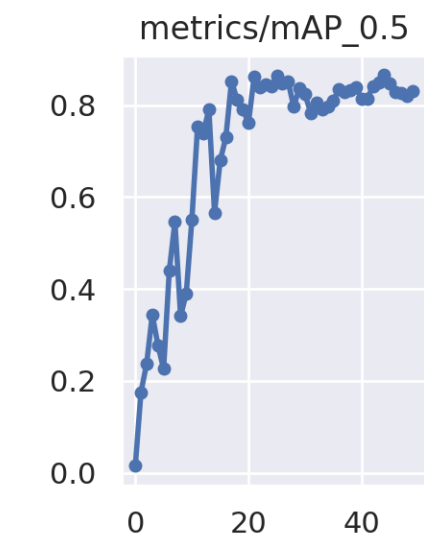
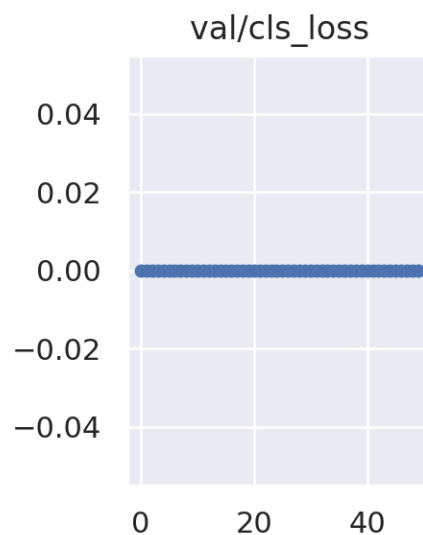
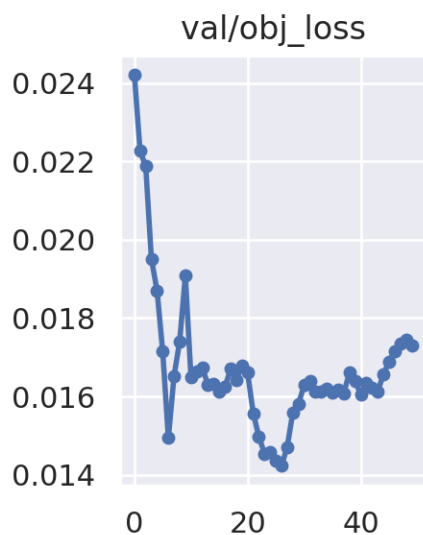
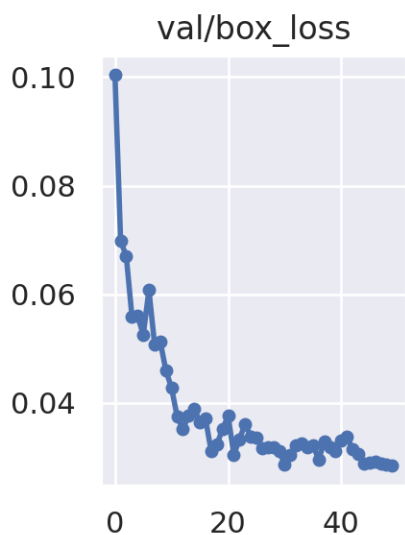
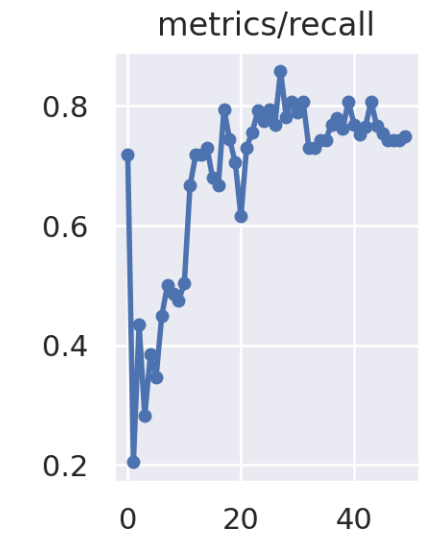
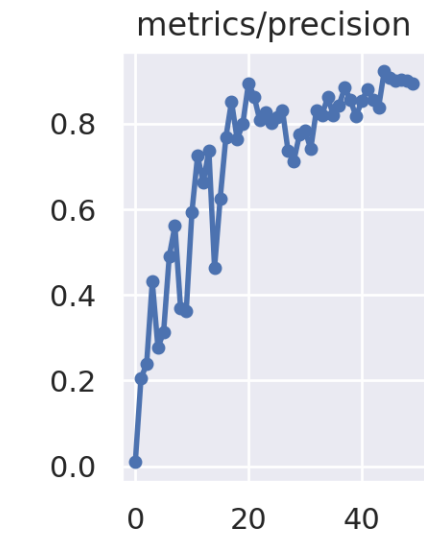
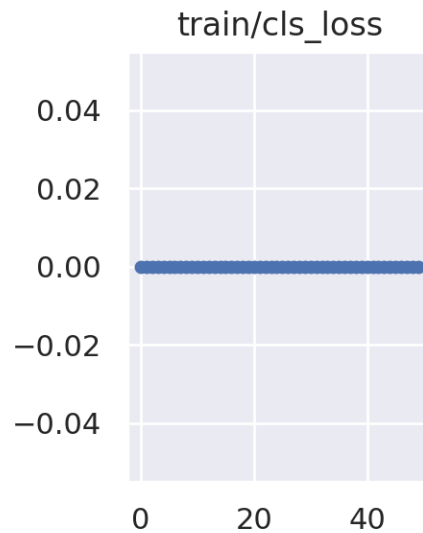
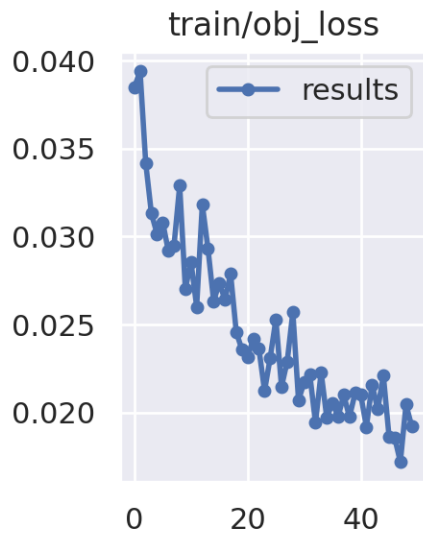
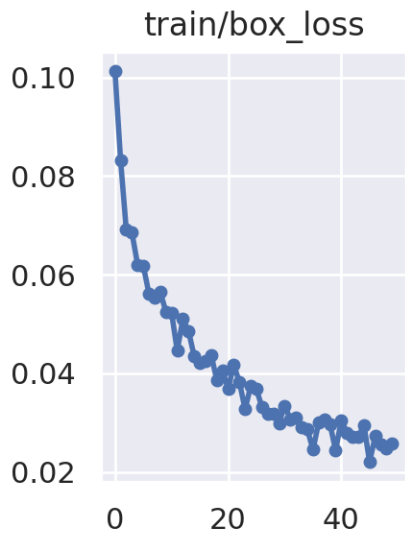


- person
- car
- chair
- bottle
- pottedplant
- bird
- dog
- sofa
- bicycle
- horse
- boat
- motorbike
- cat
- tvmonitor
- cow
- sheep
- aeroplane
- train
- diningtable
- bus
- all classes 0.86 at 0.000





Validation results

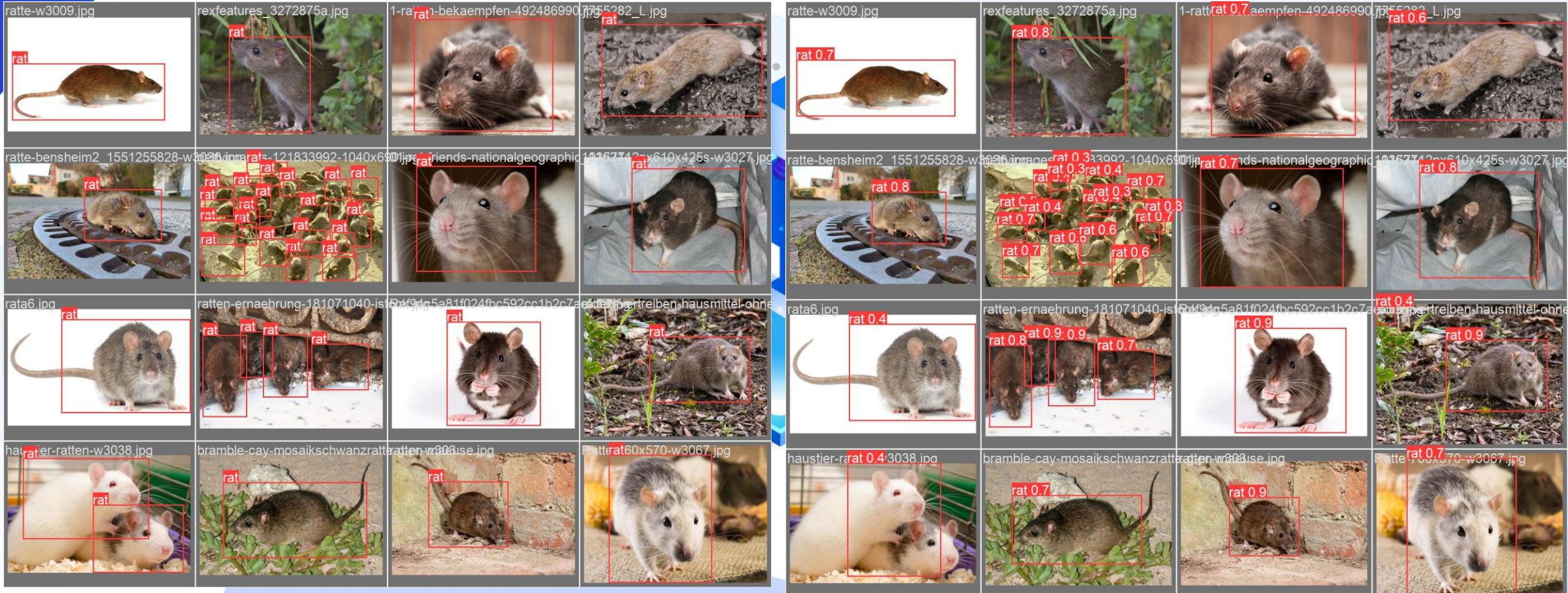




Validation results

Actual

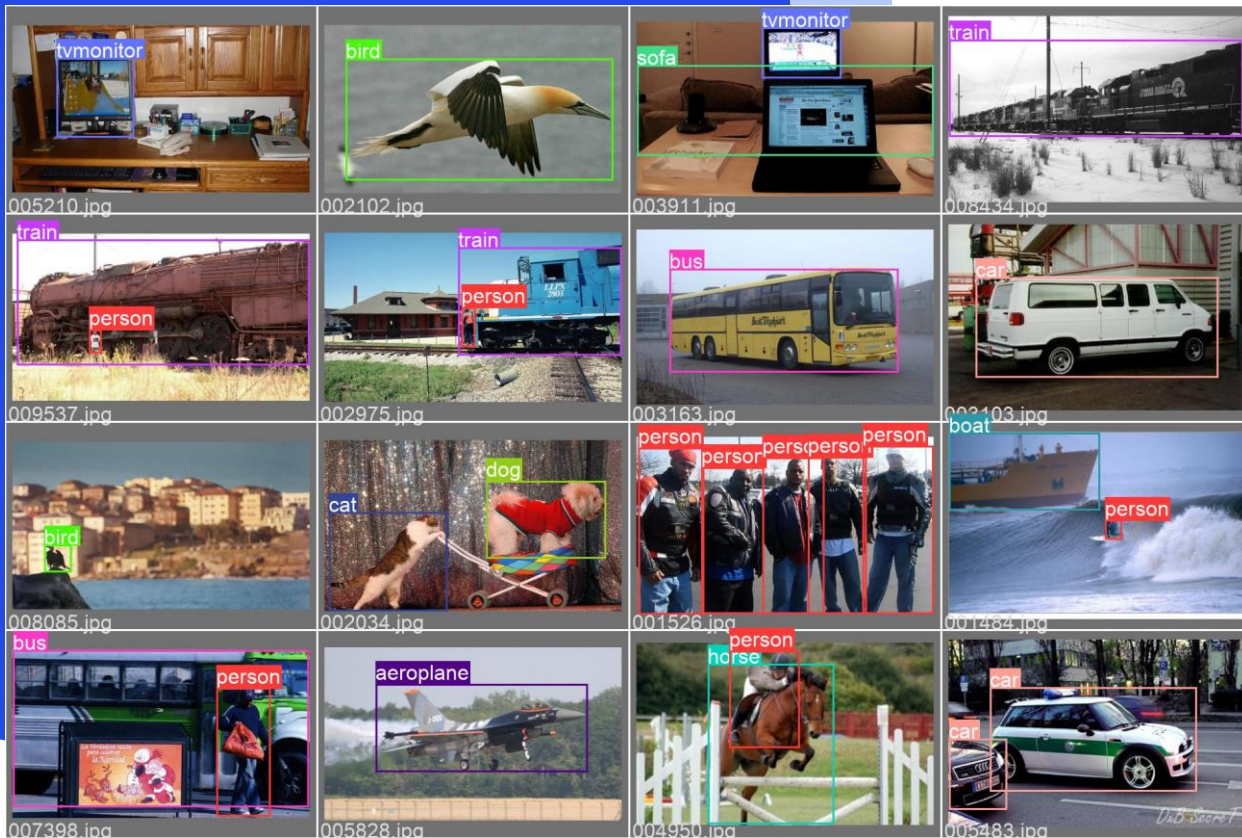
Prediction





Validation results

Actual

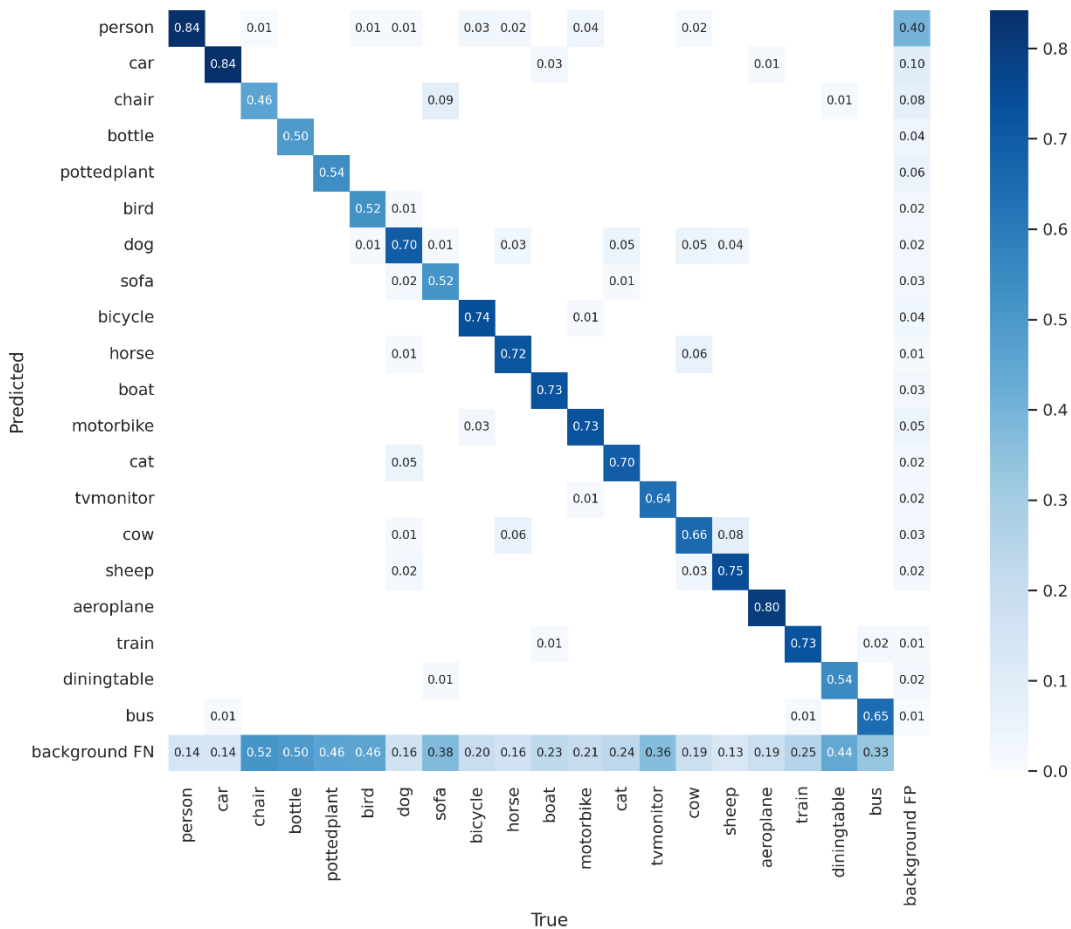


Prediction





Confusion matrix



01



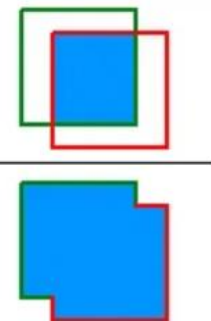
Intersection over Union (IoU)

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

02



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



IoU metric ranges from 0 and 1



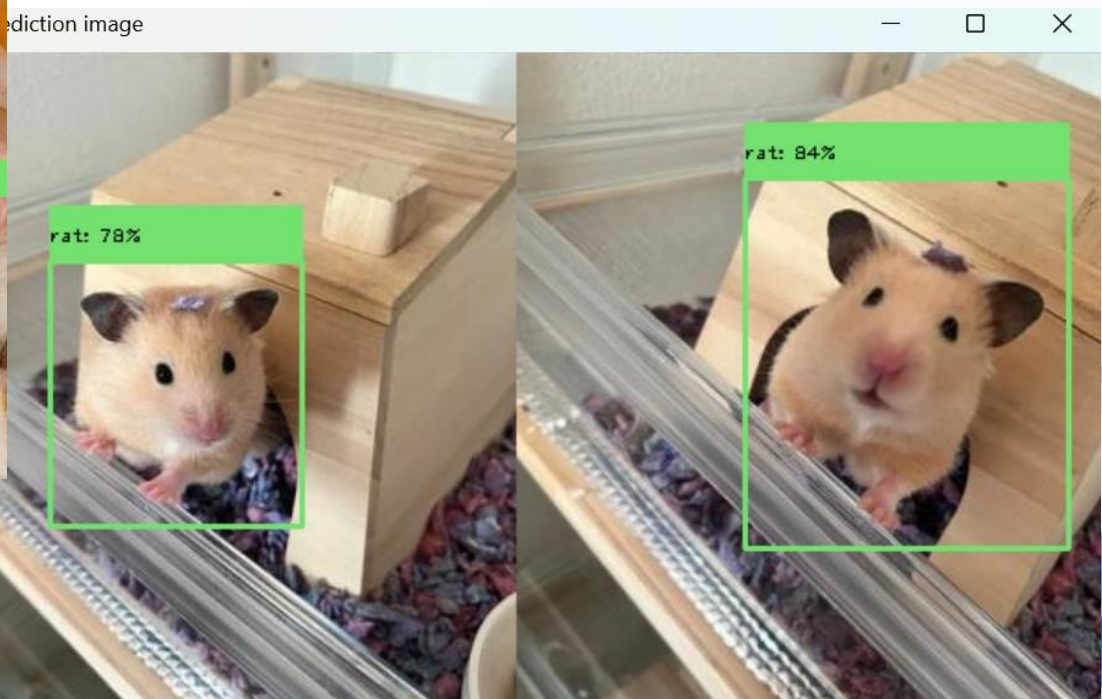
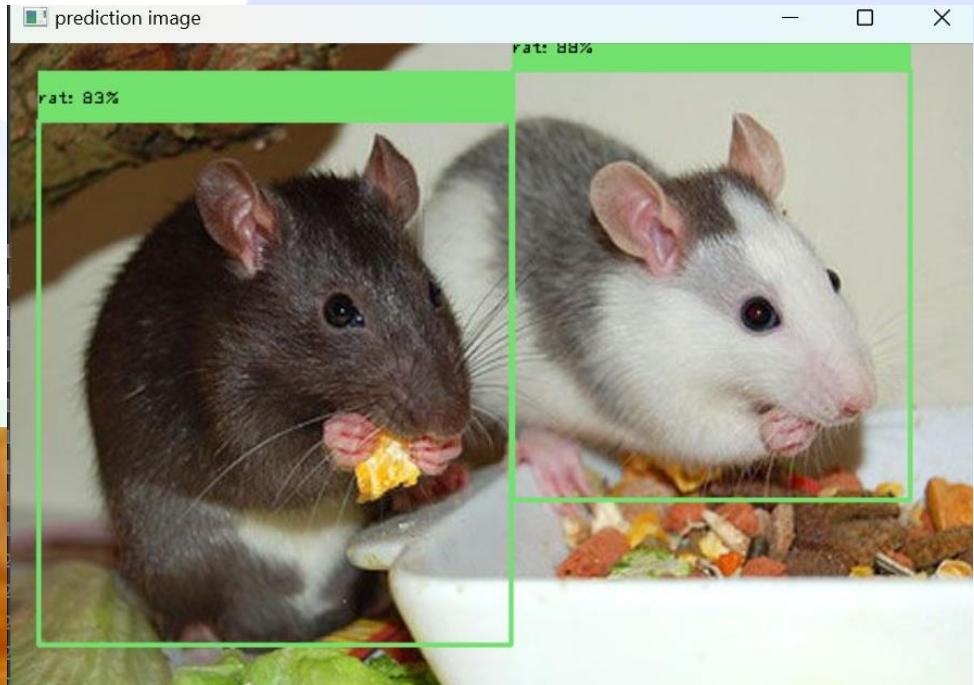
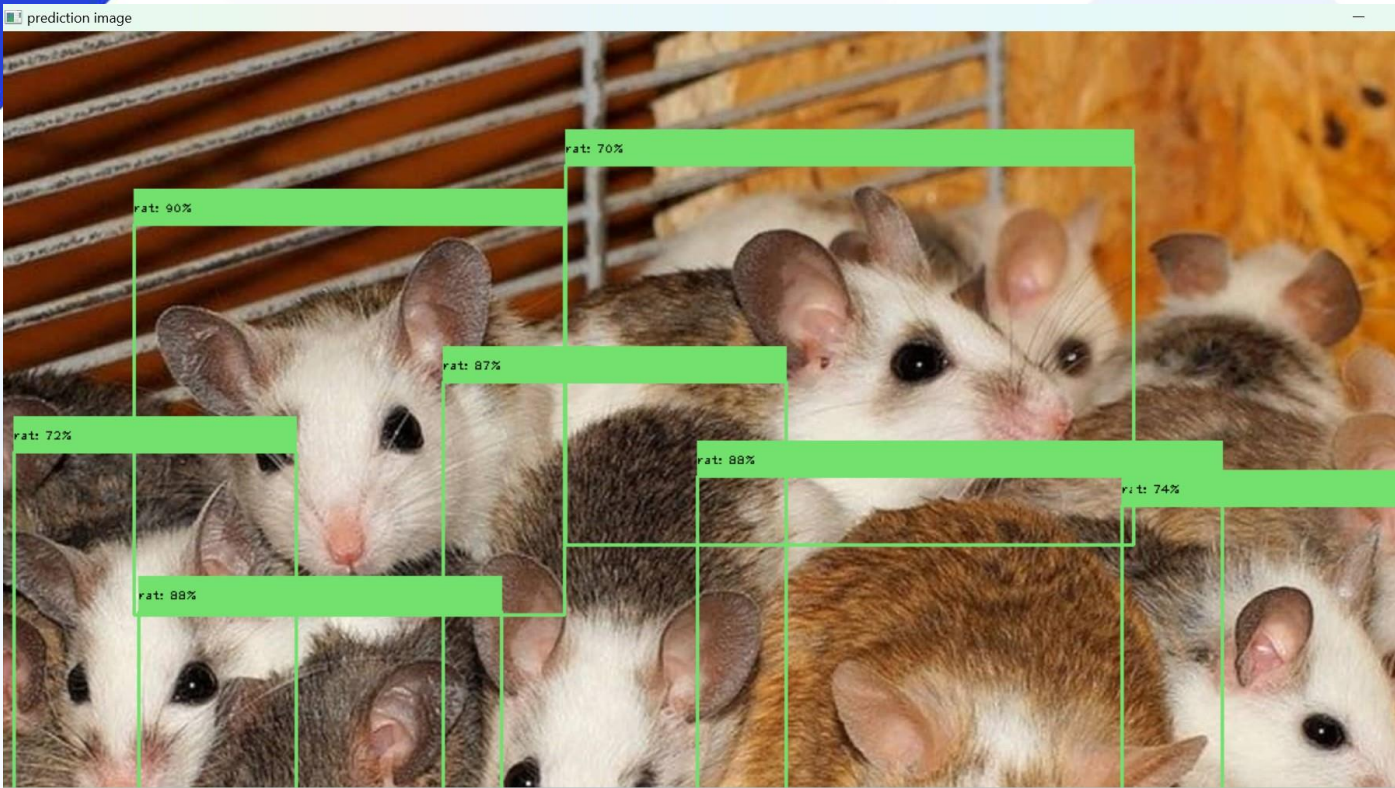


Part four

● Prediction and results ●

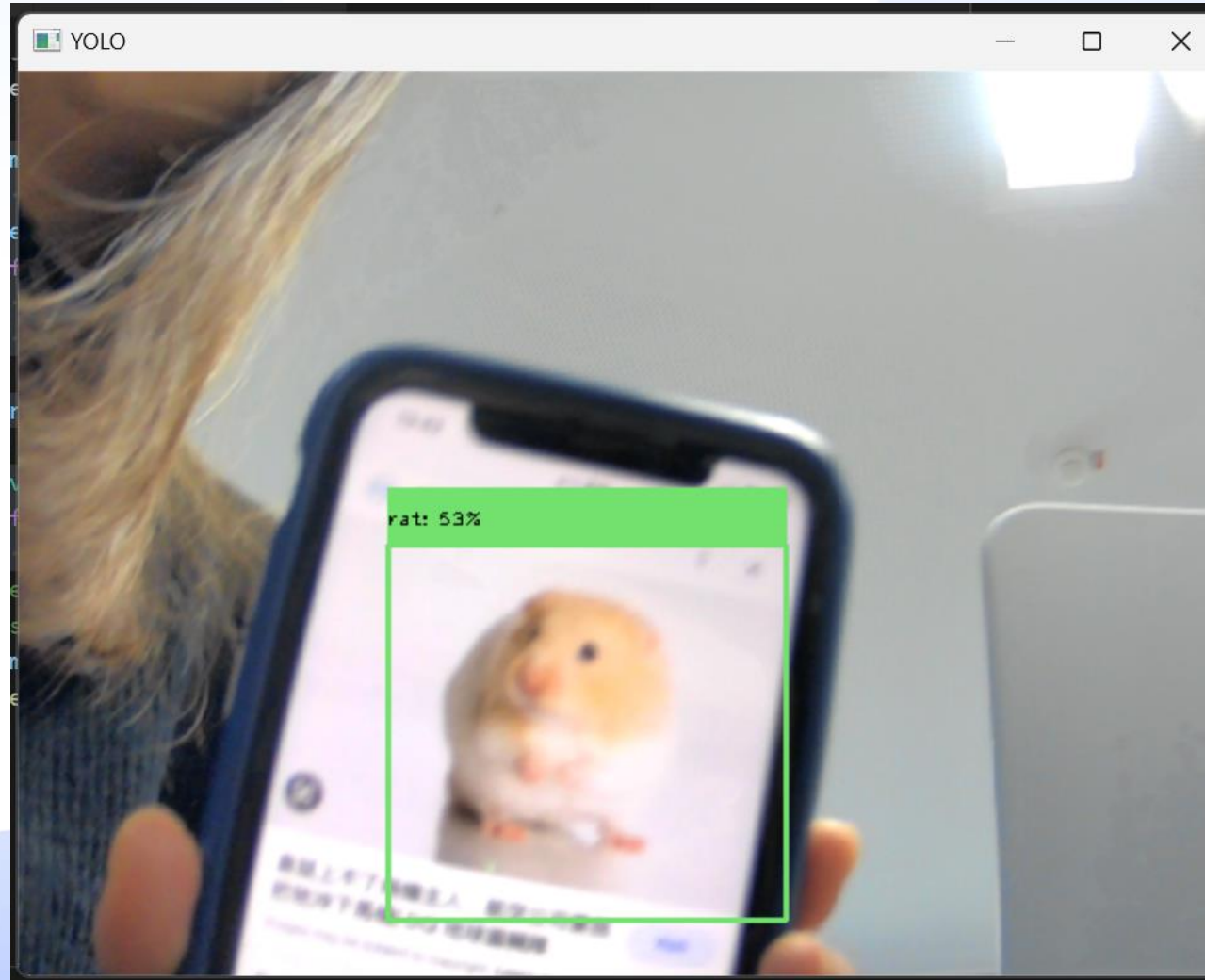


Rat detection



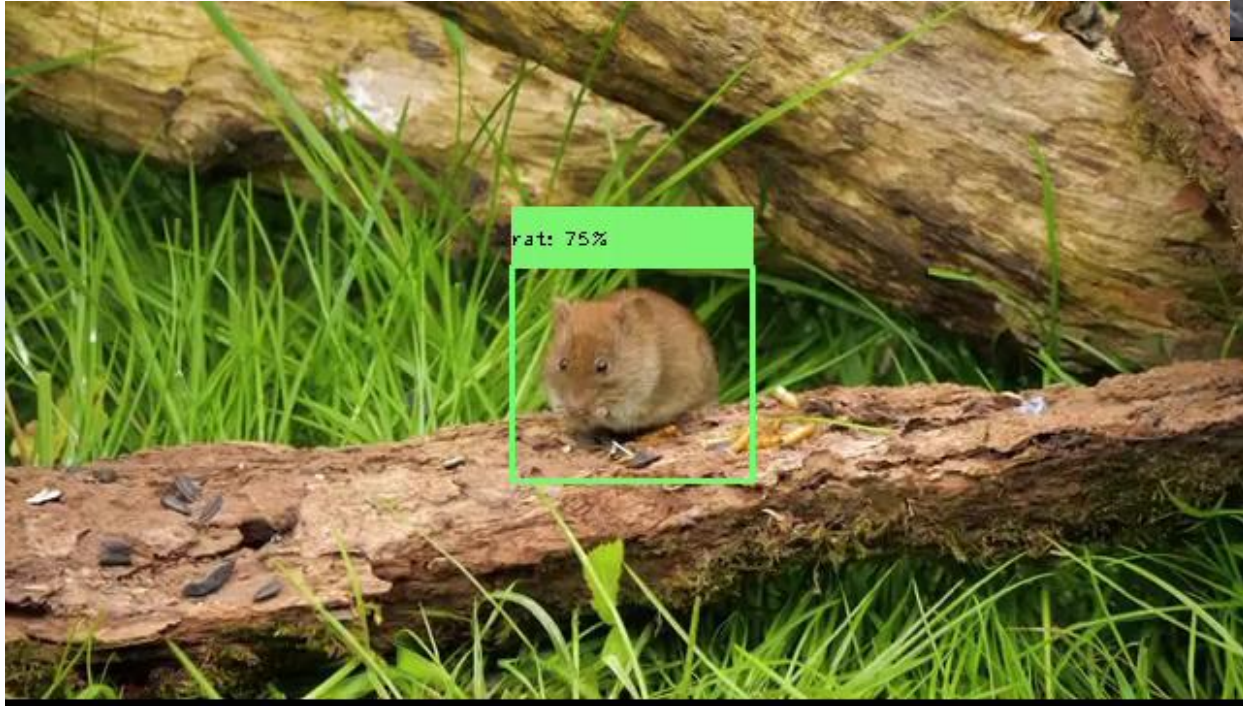
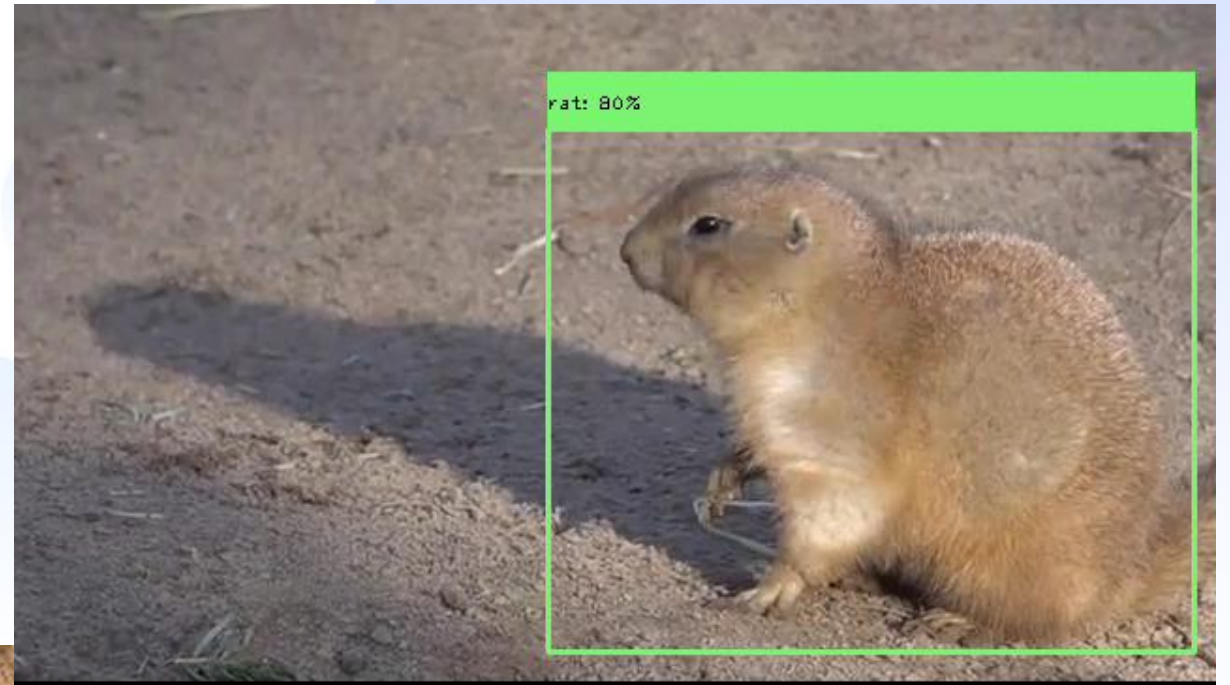


Rat detection



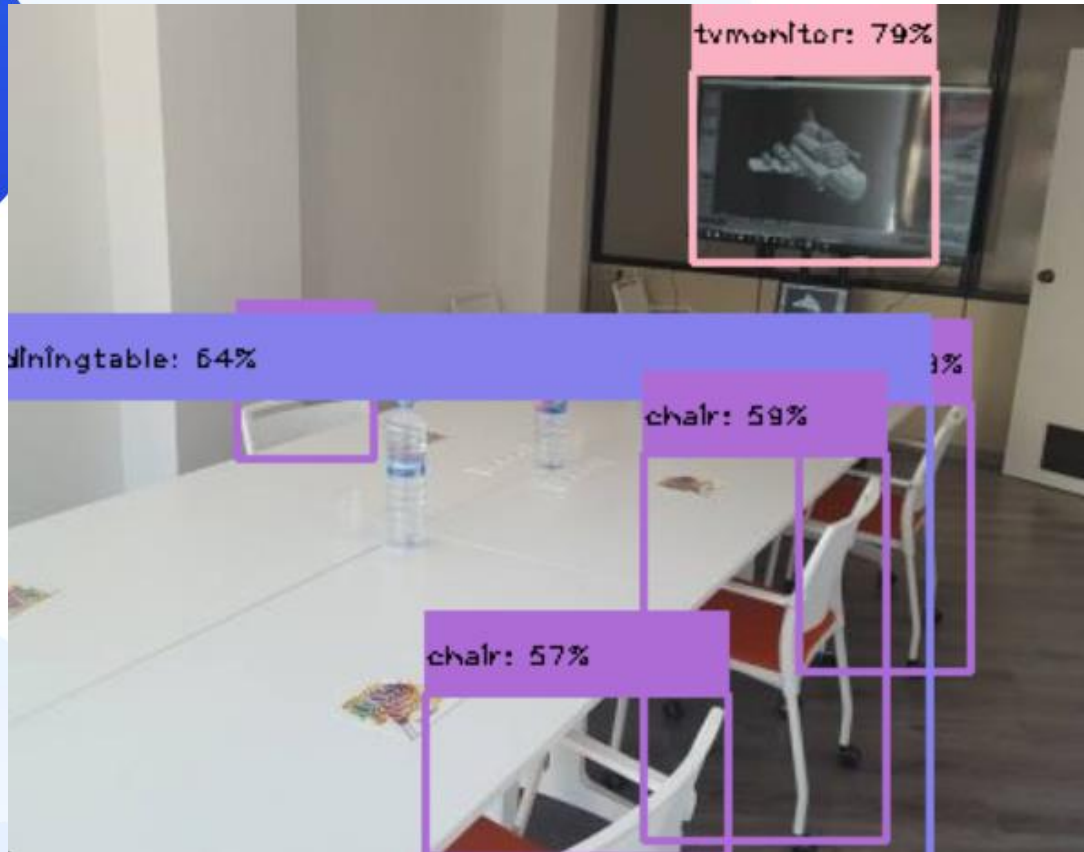


Rat detection





20 objects detection



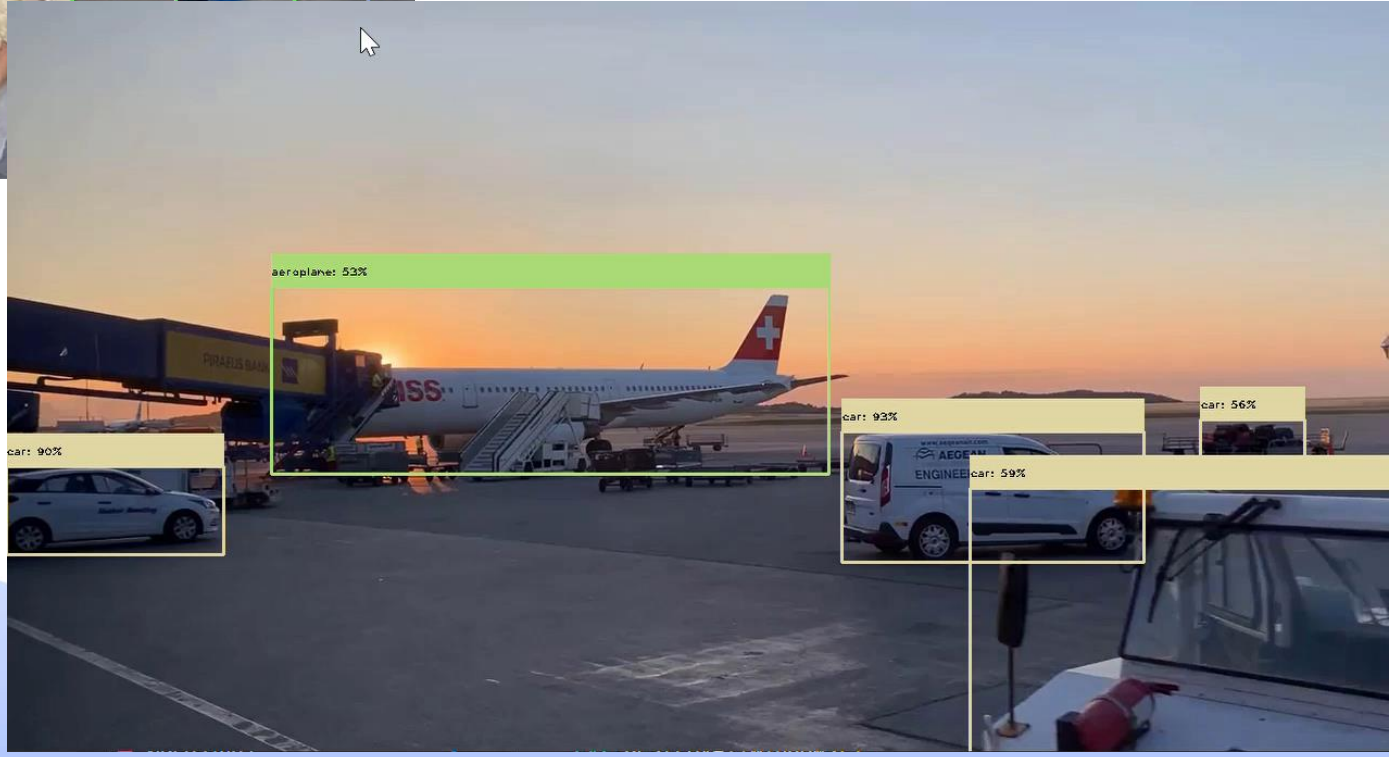
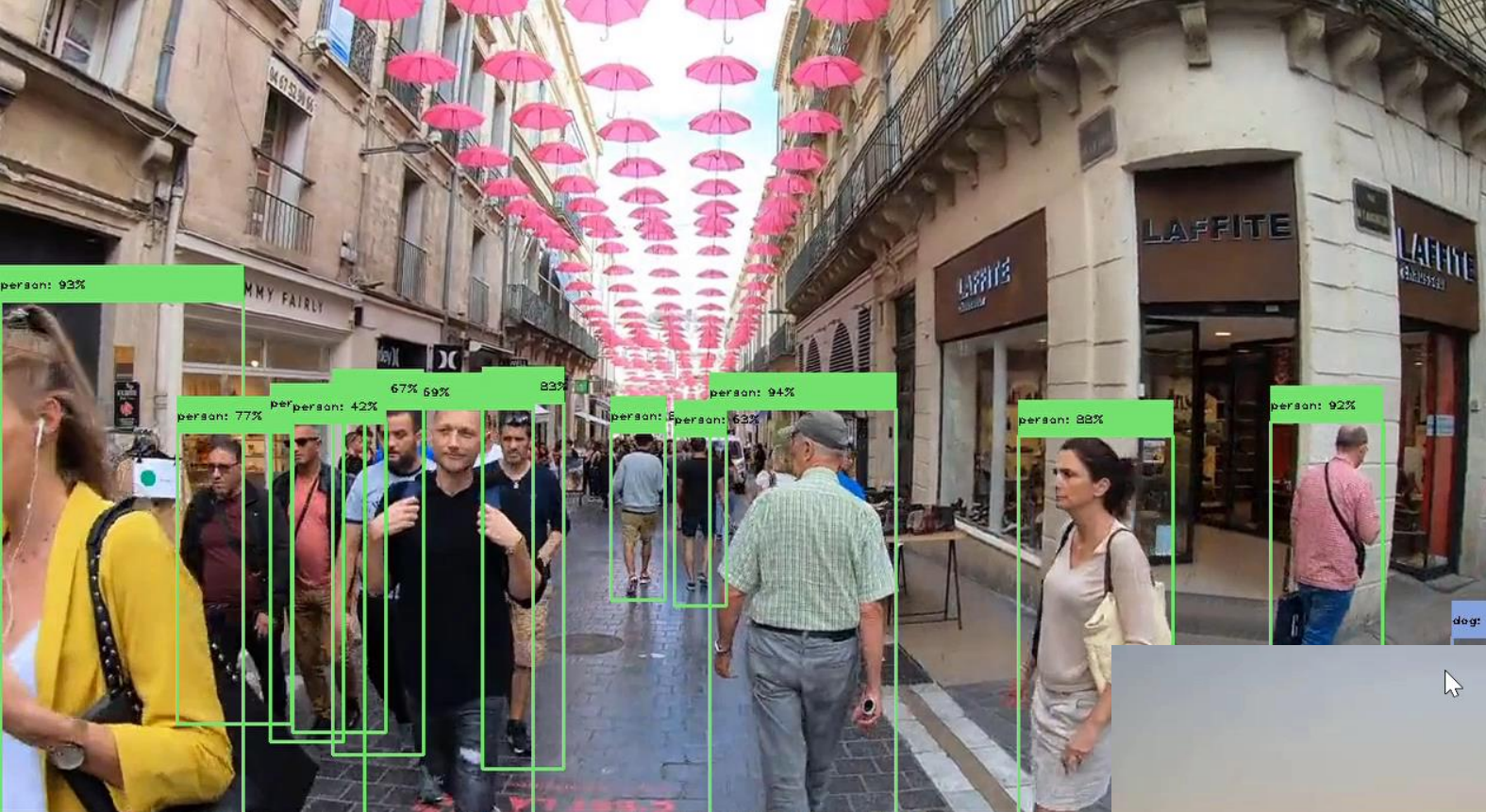


20 objects detection





20 objects detection



THANK YOU



Szu-Chi Huang

