



VIỆN TRÍ TUỆ NHÂN TẠO
TRƯỜNG ĐẠI HỌC CÔNG NGHỆ



AI4VN 2022 - VAIPE: MEDICINE PILL IMAGE RECOGNITION CHALLENGE

TEAM: PILL GATES

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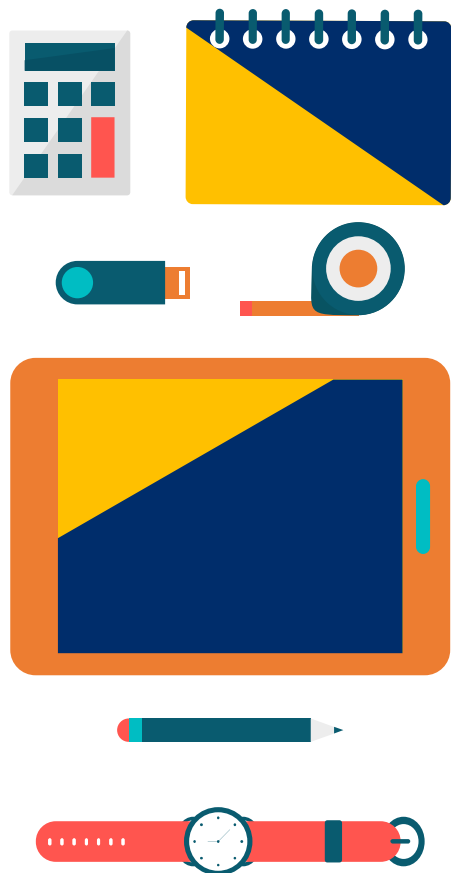
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01

Problem

01 | Problem

Training

9,500 prescribed pill images
1,171 prescription images

Valid

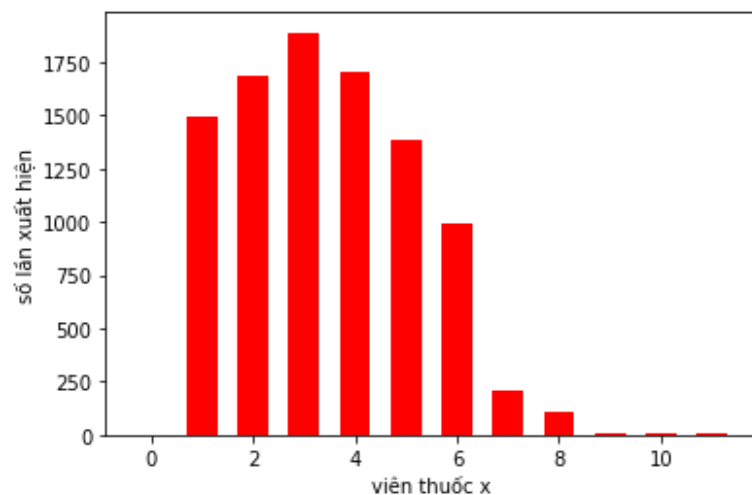
1,500 prescribed pill images
172 prescription images

Public Test

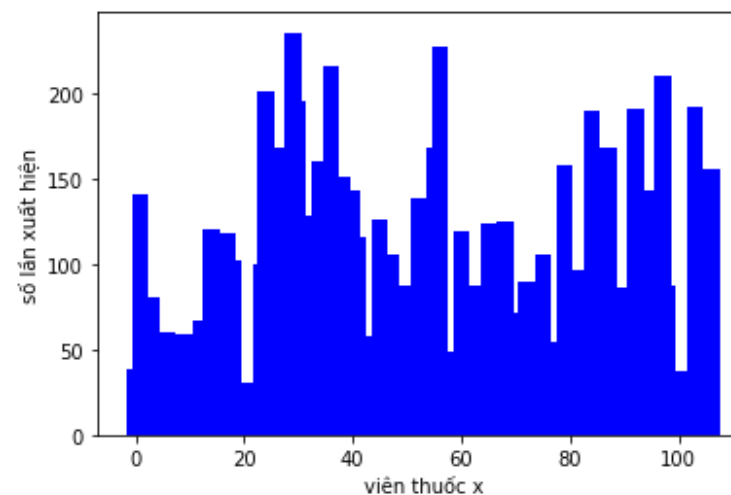
1,600 prescribed pill images
184 prescription images

Private Test

4178 prescribed pill images
829 prescription images

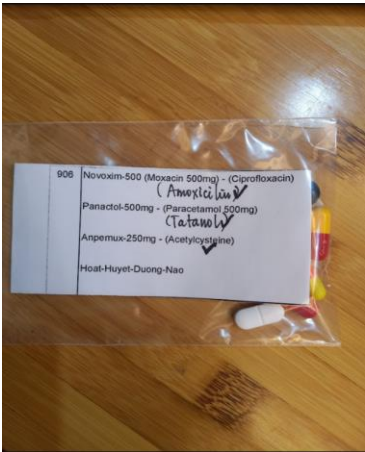


No. pills/images distribution



Labels distribution

01 Problem



Clear bag



VAIPE_P_40_14_0.jpg



VAIPE_P_40_16_0.jpg



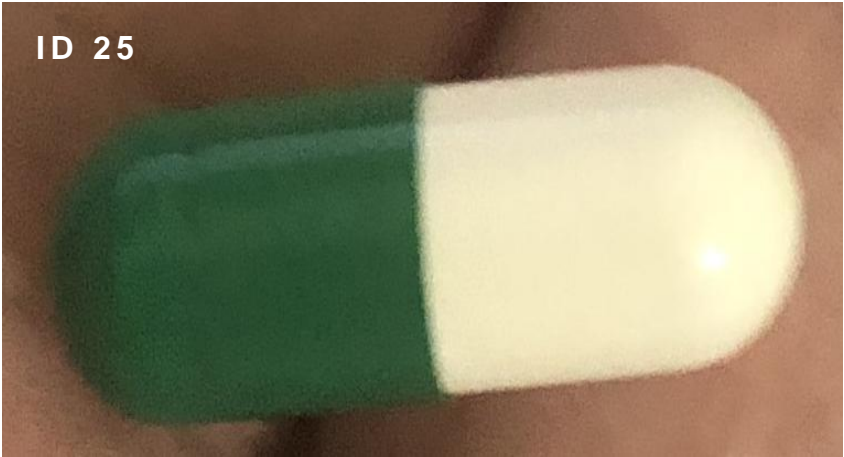
VAIPE_P_40_18_0.jpg



VAIPE_P_40_19_0.jpg



Light affect color

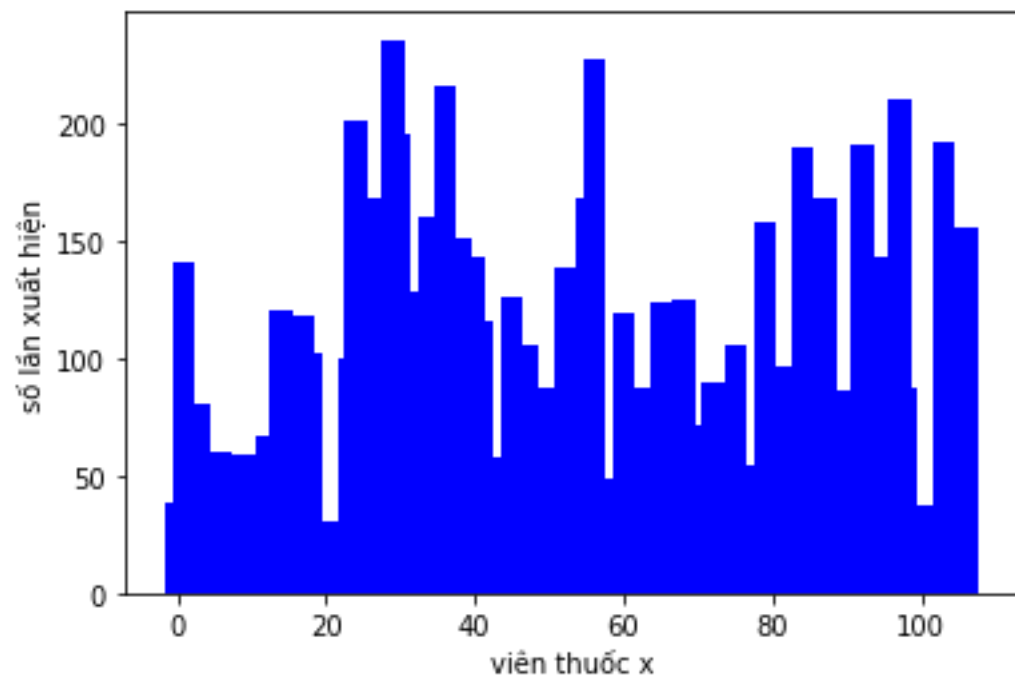


Identical appearance

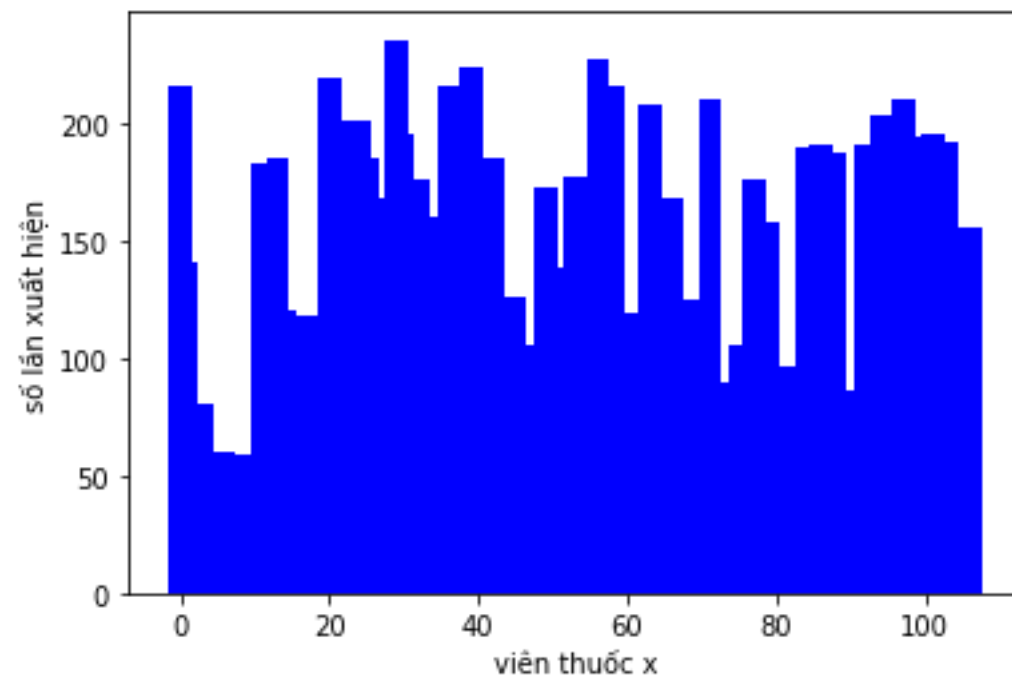


Identical appearance

Data Generation



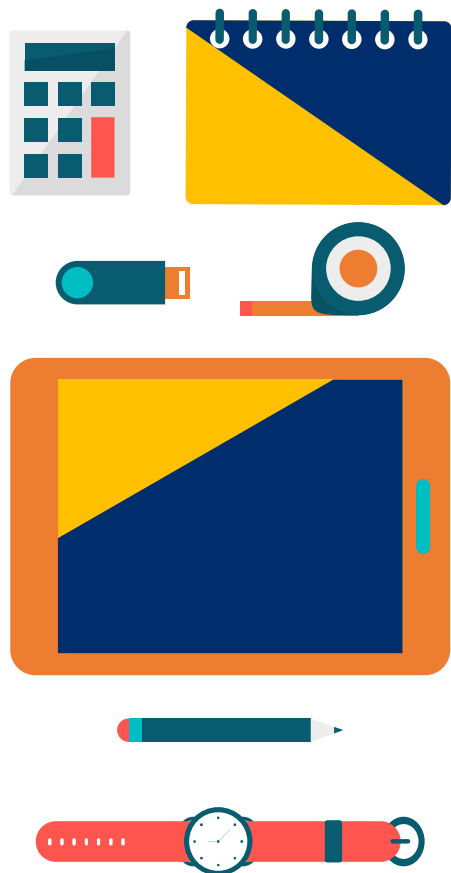
Labels distribution
before generating images



Labels distribution
after generating ~ 6000 images

Metric

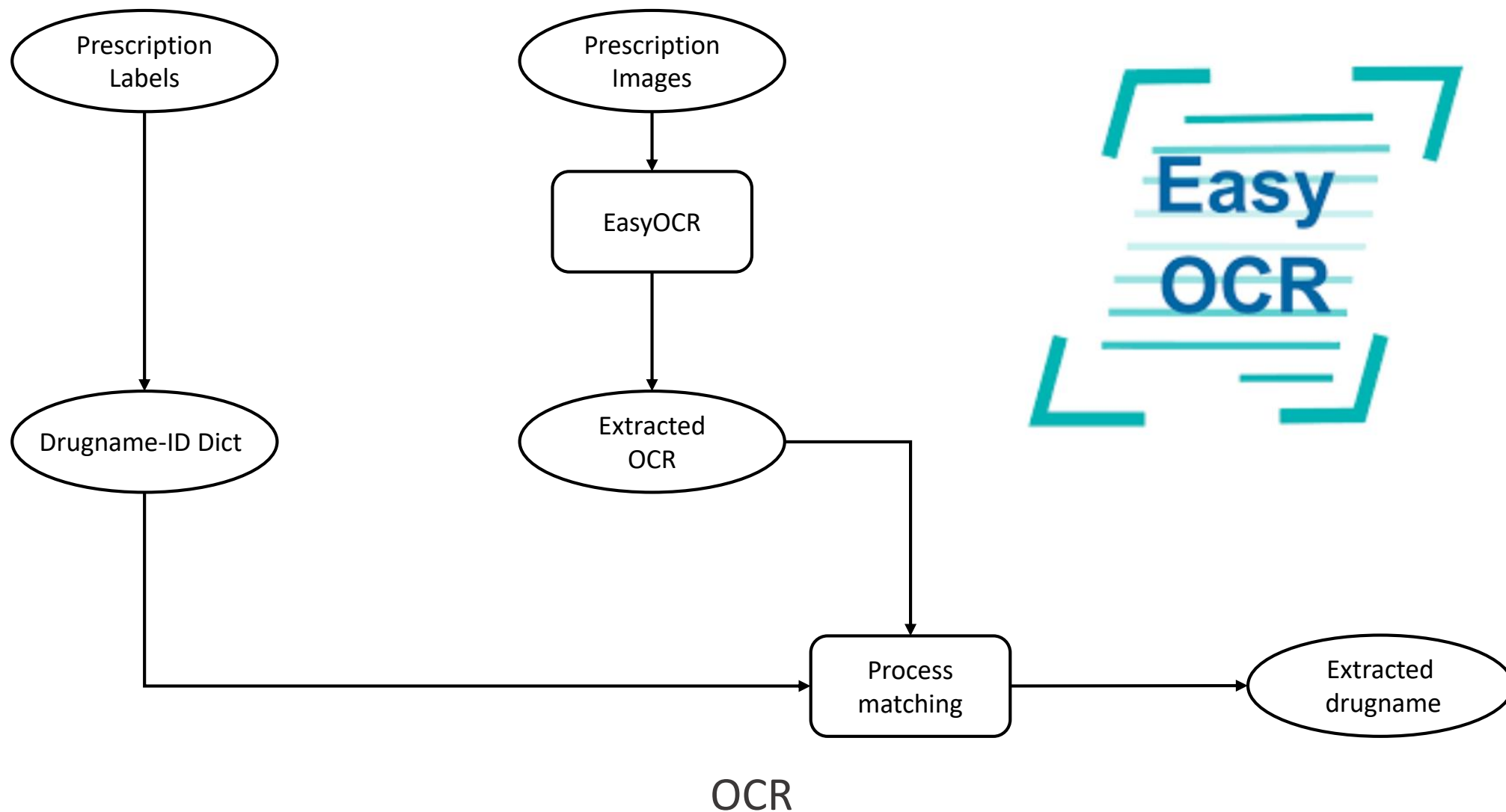
$$wmAP = \frac{1}{10(N + \alpha)} \sum_{\substack{i=0 \\ IoU=0.5+0.05i}}^{i=9} \left(\sum_{j=0}^N AP_j + \alpha AP_{N+1} \right) \quad (\alpha > 1)$$

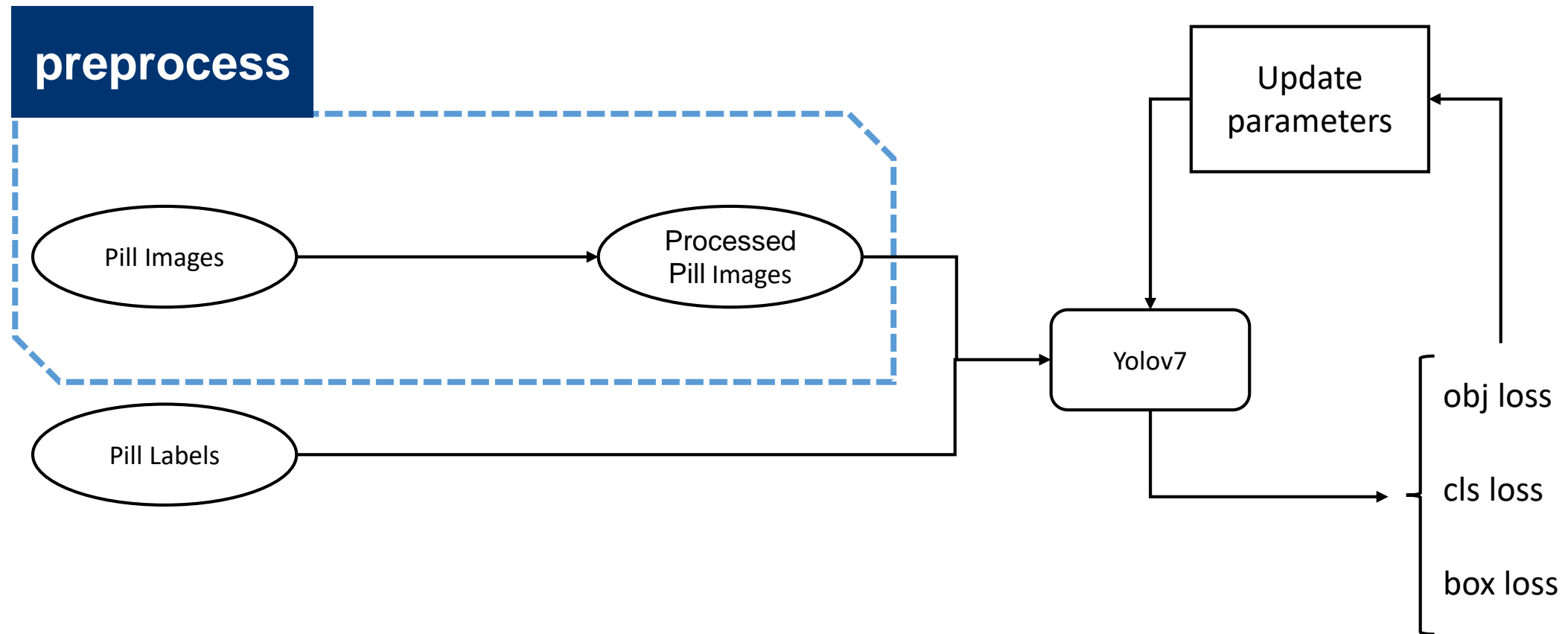


02

Method

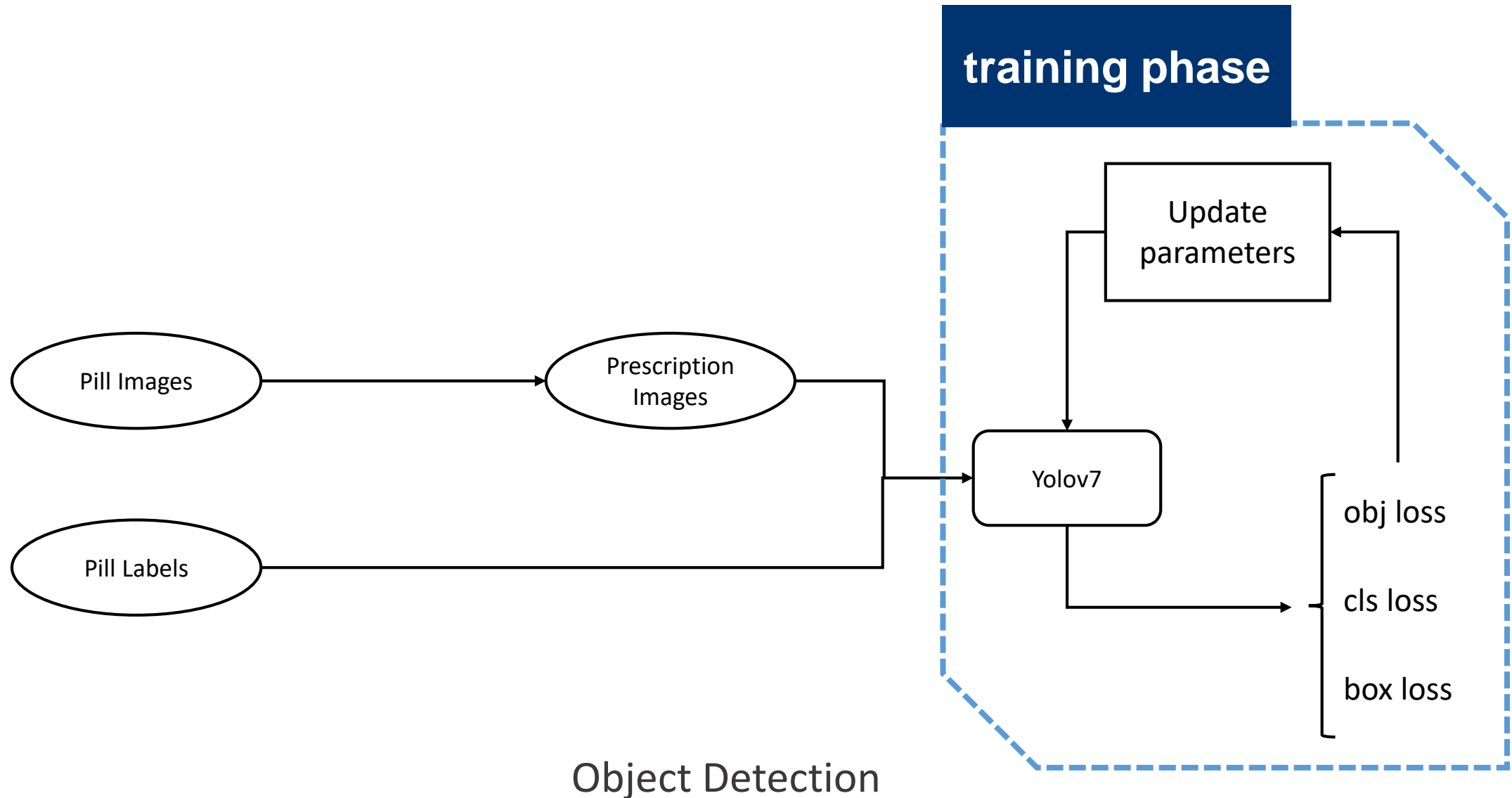
02 | Method



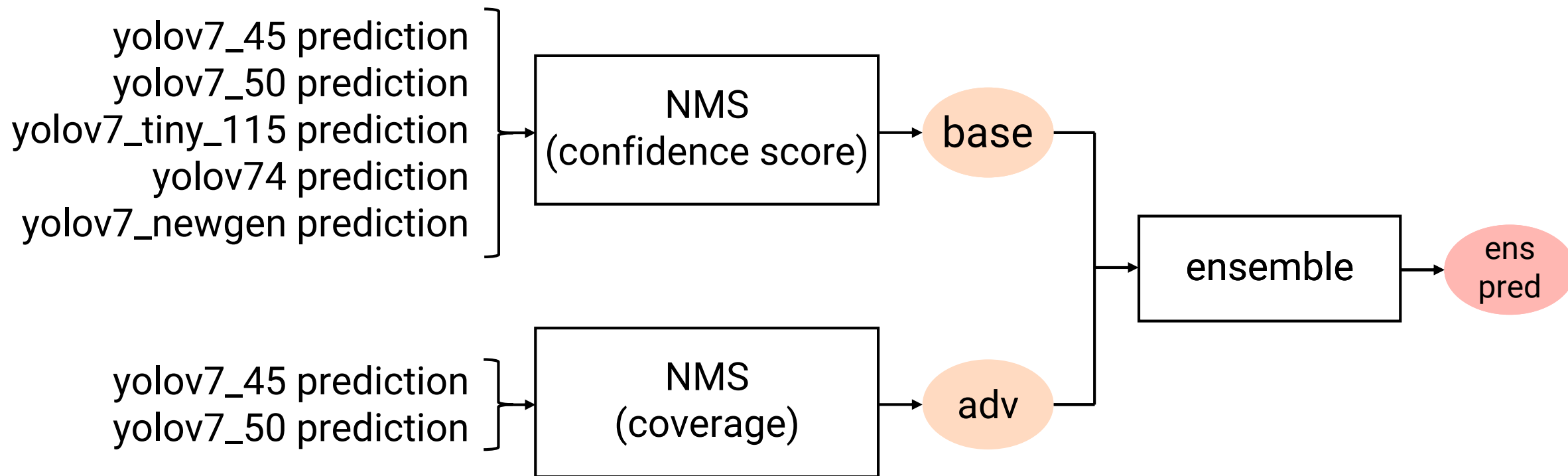


Object Detection

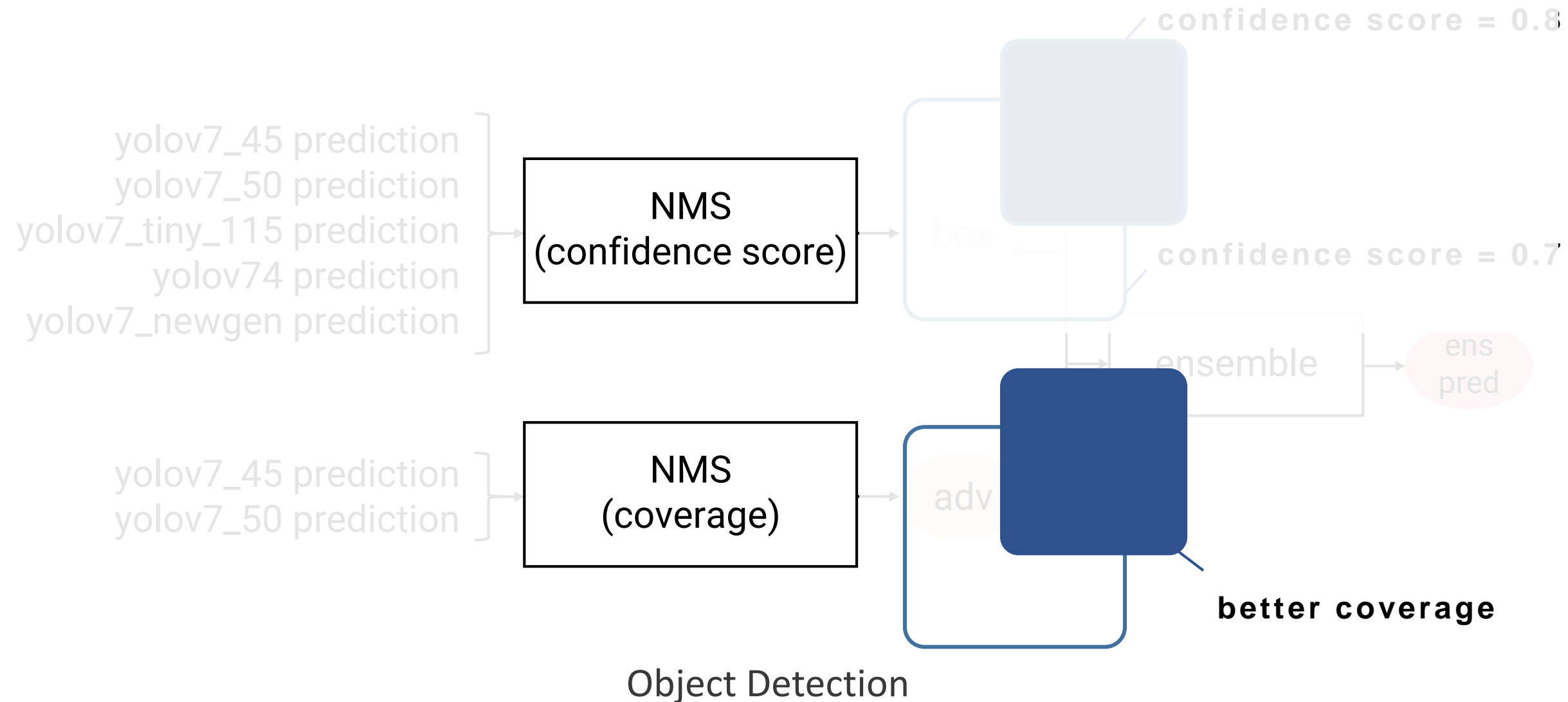
02 | Method



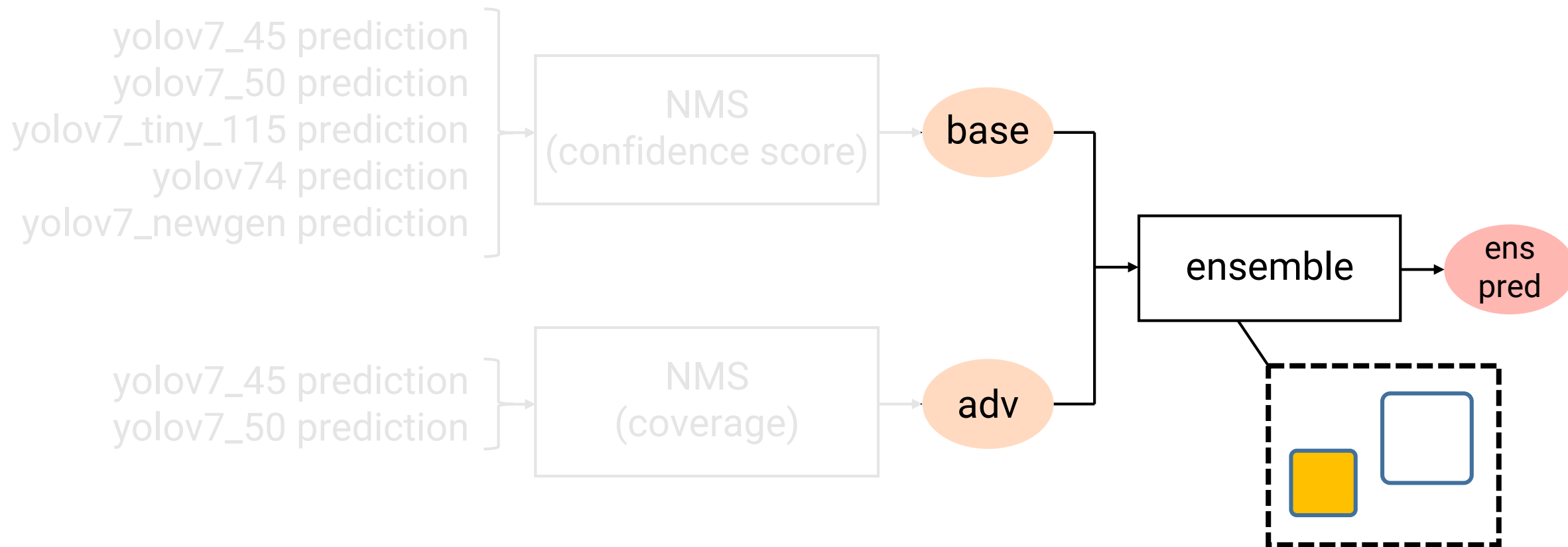
02 | Method



Object Detection

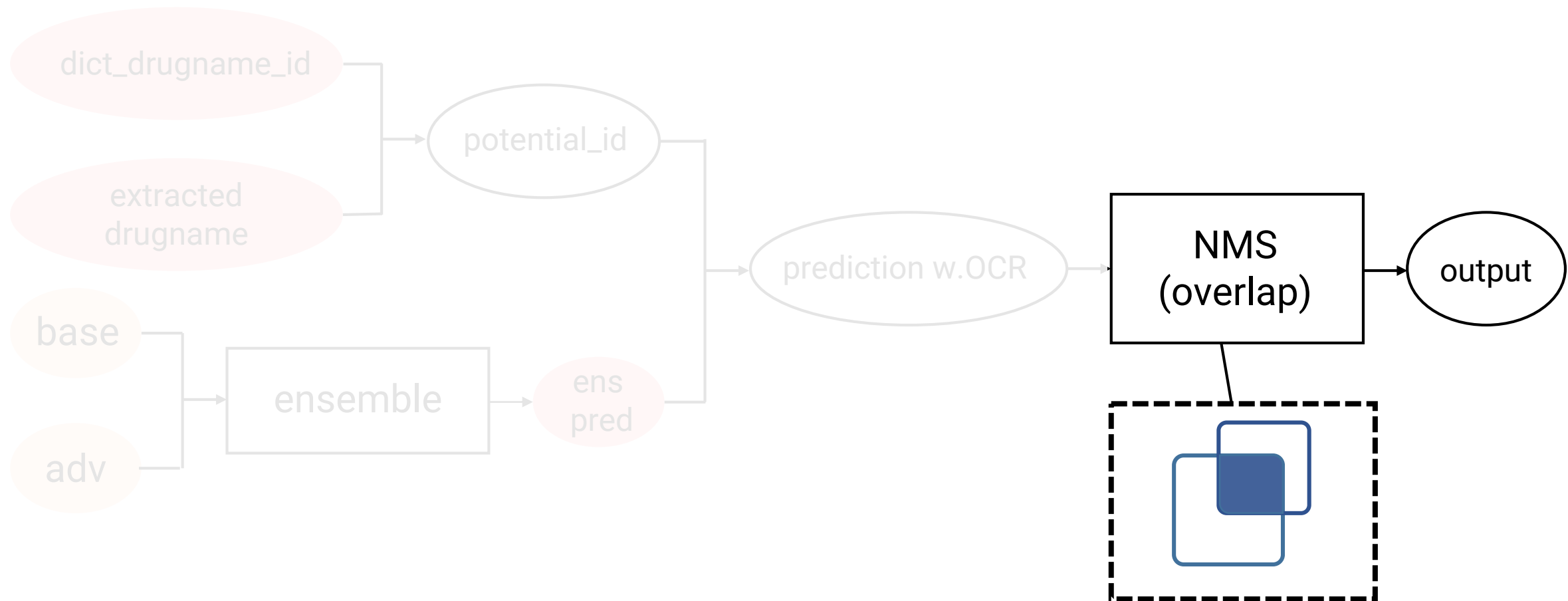


02 | Method

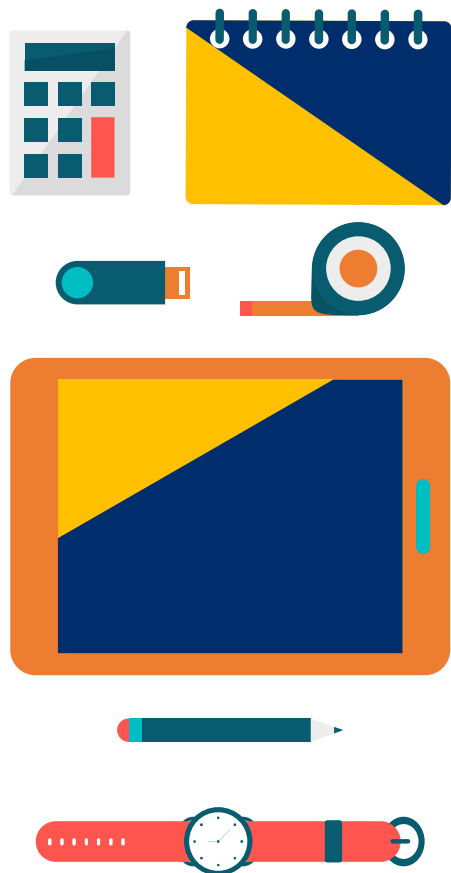


Object Detection

02 | Method



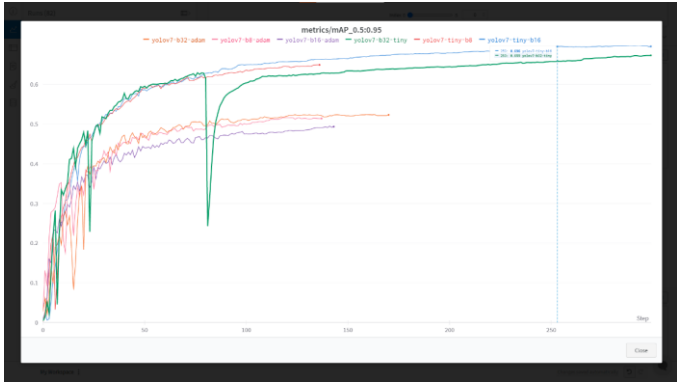
Object Detection



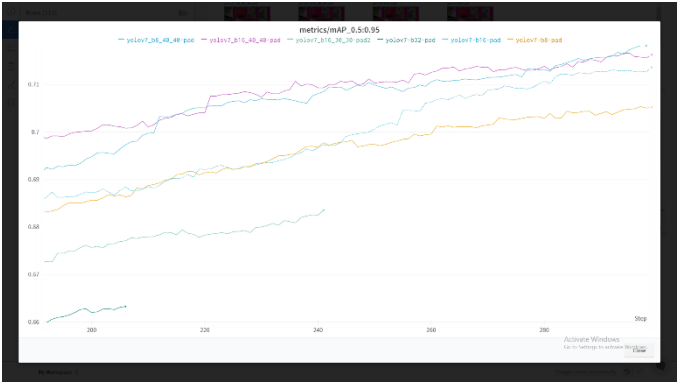
03

Experiment

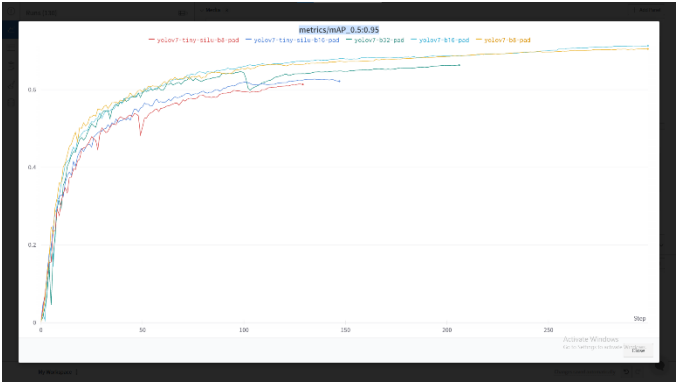
03 Experiment



SGD > Adam



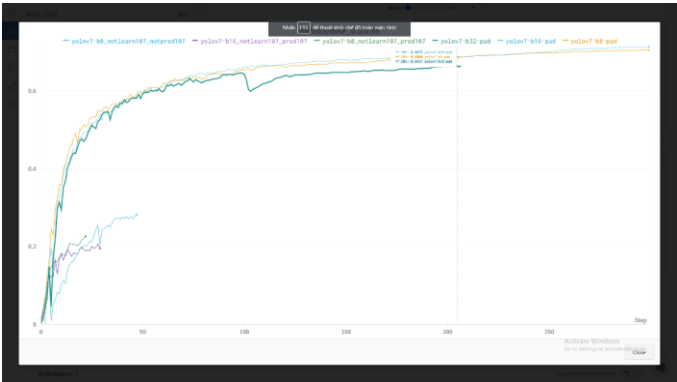
yolov7 tiny < yolov7 scale 40 40



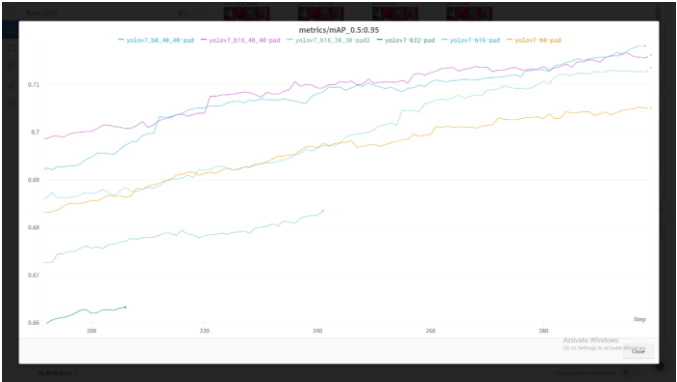
yolov7 tiny leakyrelu > yolov7 tiny silu



hue 0.15 ~ hue 0.0

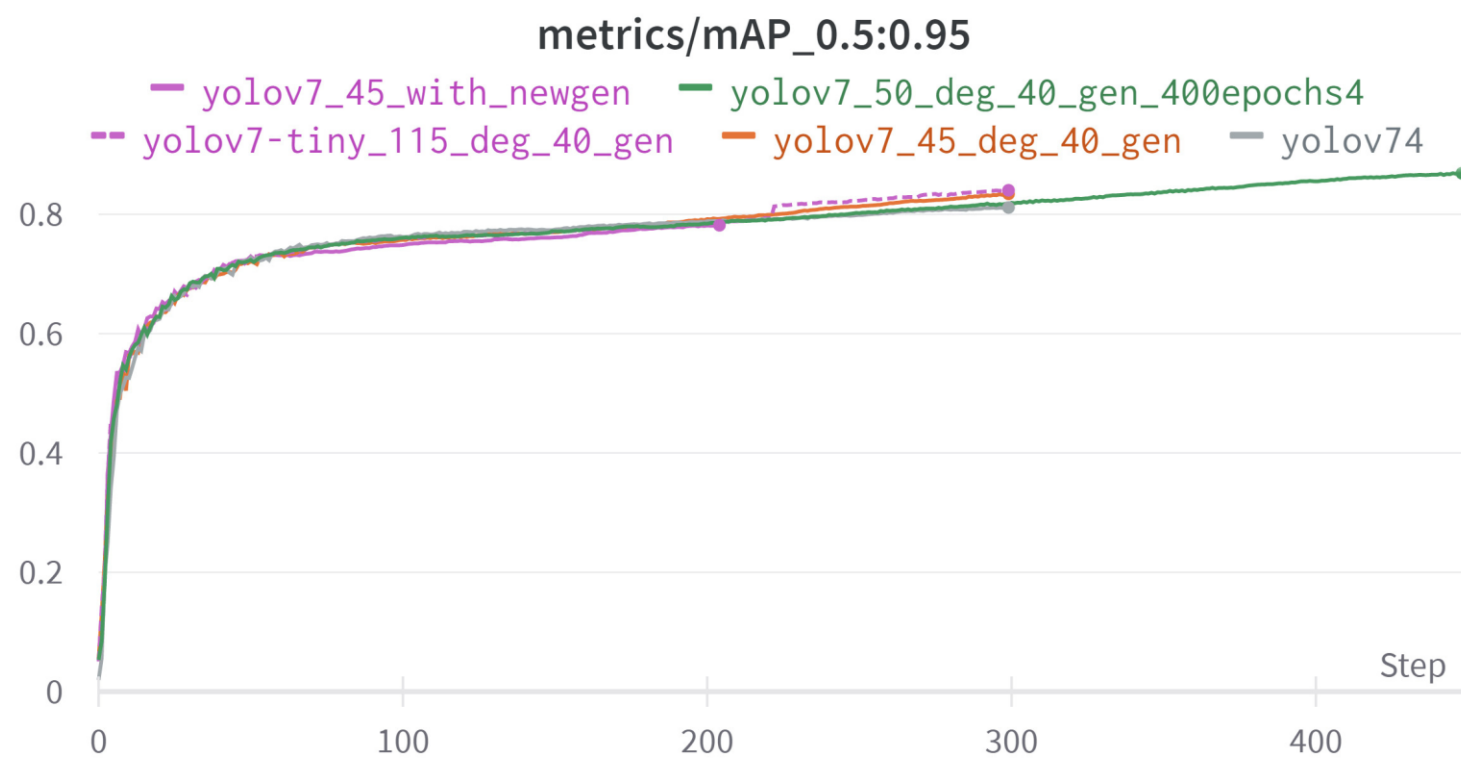


yolov7 tiny > yolov7x scale



yolov7 tiny > yolov7-w6 scale

03 Experiment

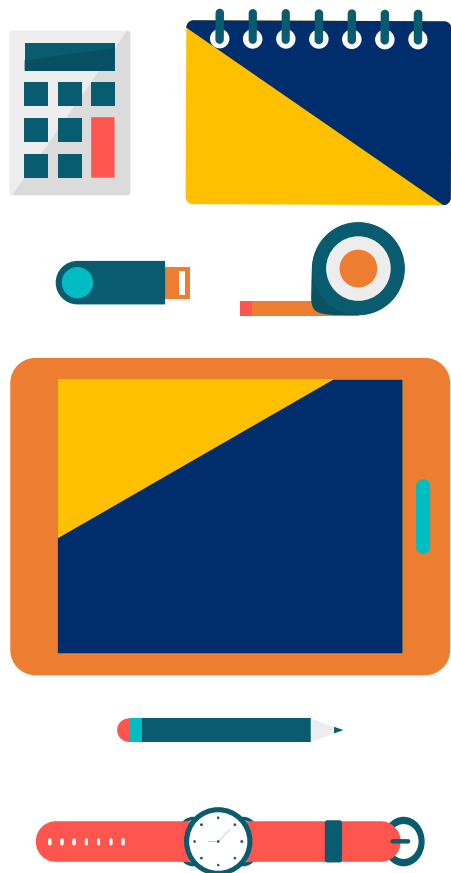


MEAN: 0.8273

03 | Experiment



Model	Epochs	Width scale	mAP_0.5:0.95
yolov7_45	450	45%	0.8398
yolov7_50	450	50%	0.8689
yolov7_tiny_115	300	115%	0.8403
yolov74	300	100%	0.8114
yolov7newgen	204	45%	0.7817



04

Conclusion

04 | Conclusion

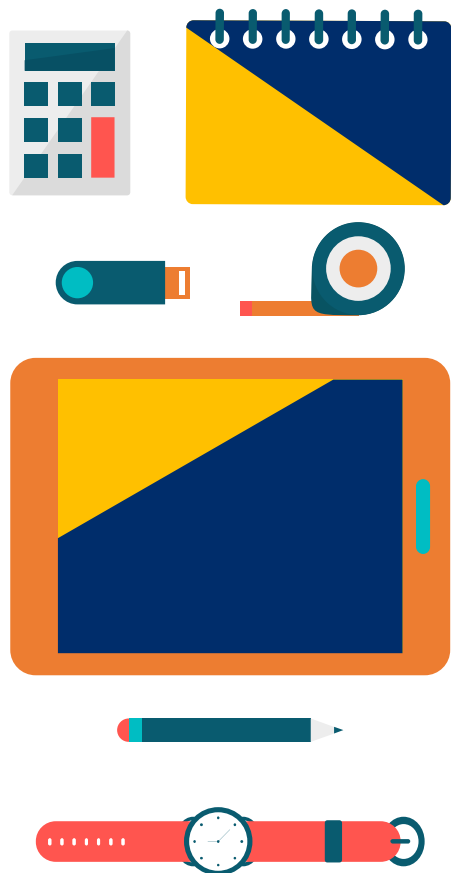


Metric	Value
wmAP	0.491900
wmAP50	0.724500
wmAP75	0.565600
wmAPs	-1.000000
wmAPm	0.040800
wmAPI	0.492400

04 | Conclusion



- ☐ Training with generated data is more effective than without generating data
- ☐ Ensemble of various multiclass models is better than only one multiclass model
- ☐ Ensembling with singleclass models is better than without singleclass model
- ☐ NMS shows significant improvement
- ☐ Noise training data
- ☐ Metric is trivial



05

Future Works

05 | Future works



- ☐ Tightening bounding box in every ensemble phases.
- ☐ Generating more data
- ☐ Augmenting data
- ☐ Using rembg model for tightening bounding box
- ☐ Using output of single class model as an input for classify model.
- ☐ Applying semi-supervised methods

Thank you!

Presented by Pill Gates

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