

지능화 캡스톤 프로젝트

프로젝트 #2 중간 발표

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충북대학교 산업인공지능학과

[21-7조] 봉은정, 김원우

I. 학습 환경

❖ 프로젝트 개발 환경

- RTX 2060
- UBUNTU 18.04 / 20.04
- Anaconda 가상환경

II. YOLOv5 학습

1) 이미지 라벨링



2) xml 파일 생성& txt 변환

3) YOLOv5s 모델 사용

```
from n  params module arguments
0 -1 1 3520 models.common.Conv [3, 32, 6, 2, 2]
1 -1 1 18560 models.common.Conv [32, 64, 3, 2]
2 -1 1 18816 models.common.C3 [64, 64, 1]
3 -1 1 73984 models.common.Conv [64, 128, 3, 2]
4 -1 2 115712 models.common.C3 [128, 128, 2]
5 -1 1 295424 models.common.Conv [128, 256, 3, 2]
6 -1 3 625152 models.common.C3 [256, 256, 3]
7 -1 1 1180672 models.common.Conv [256, 512, 3, 2]
8 -1 1 1182720 models.common.C3 [512, 512, 1]
9 -1 1 656896 models.common.SPPF [512, 512, 5]
10 -1 1 131584 models.common.Conv [512, 256, 1, 1]
11 -1 1 0 torch.nn.modules.upsampling.Upsample [None, 2, 'nearest']
12 [-1, 6] 1 0 models.common.Concat [1]
13 -1 1 361984 models.common.C3 [512, 256, 1, False]
14 -1 1 33024 models.common.Conv [256, 128, 1, 1]
15 -1 1 0 torch.nn.modules.upsampling.Upsample [None, 2, 'nearest']
16 [-1, 4] 1 0 models.common.Concat [1]
17 -1 1 90880 models.common.C3 [256, 128, 1, False]
18 -1 1 147712 models.common.Conv [128, 128, 3, 2]
19 [-1, 14] 1 0 models.common.Concat [1]
20 -1 1 296448 models.common.C3 [256, 256, 1, False]
21 -1 1 590336 models.common.Conv [256, 256, 3, 2]
22 [-1, 10] 1 0 models.common.Concat [1]
23 -1 1 1182720 models.common.C3 [512, 512, 1, False]
24 [17, 20, 23] 1 18879 models.yolo.Detect [2, [[10, 13, 16, 30, 33, 23],
YOLOv5s summary: 270 layers, 7025023 parameters, 7025023 gradients, 15.9 GFLOPs
```

4) 모델 학습

```
YOLOv5s summary: 213 layers, 7015519 parameters, 0 gradients, 15.8 GFLOPs
Class Images Labels P R mAP@.5 mAP@.5:.95: 100%
all 500 1944 0.942 0.938 0.971 0.632
head 500 495 0.933 0.925 0.958 0.603
helmet 500 1449 0.951 0.95 0.983 0.662
Results saved to runs/train/exp3
```

III. YOLOv5 추론

❖ 추론 결과

- runs/detect/result 폴더에 추론 결과 저장



hard_hat_workers624.png

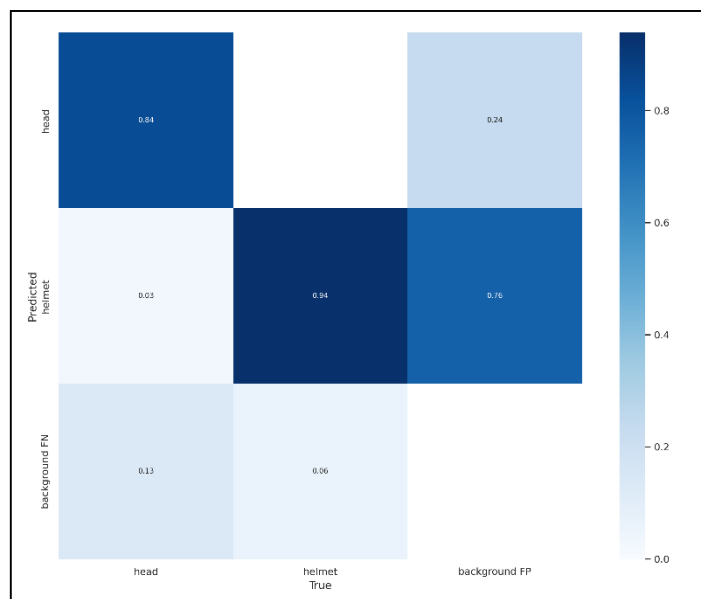
Class	BoundingBox					Confidence
0	0.292067	0.38101	0.0745192	0.09375		0.282938
0	0.507212	0.384615	0.0625	0.0817308		0.818057
0	0.348558	0.388221	0.0625	0.0889423		0.852339
1	0.489183	0.313702	0.0600962	0.0793269		0.856907
0	0.737981	0.379808	0.0625	0.0865385		0.86263
1	0.555288	0.358173	0.0625	0.0913462		0.86565
1	0.286058	0.382212	0.0673077	0.0913462		0.867706
1	0.435096	0.355769	0.0673077	0.0913462		0.868196
0	0.629808	0.430288	0.0673077	0.0865385		0.890085
1	0.679087	0.352163	0.0697115	0.0889423		0.905757

hard_hat_workers624.txt

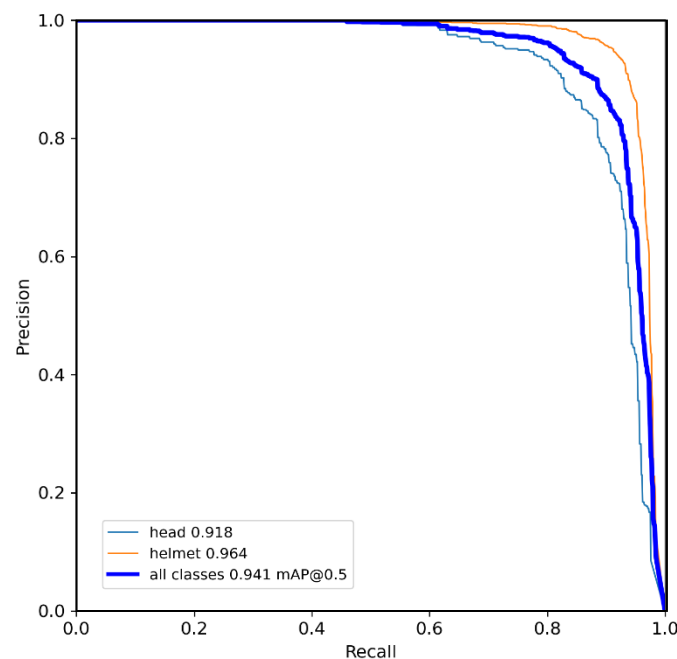
IV. YOLOv5 검증

❖ 검증 결과

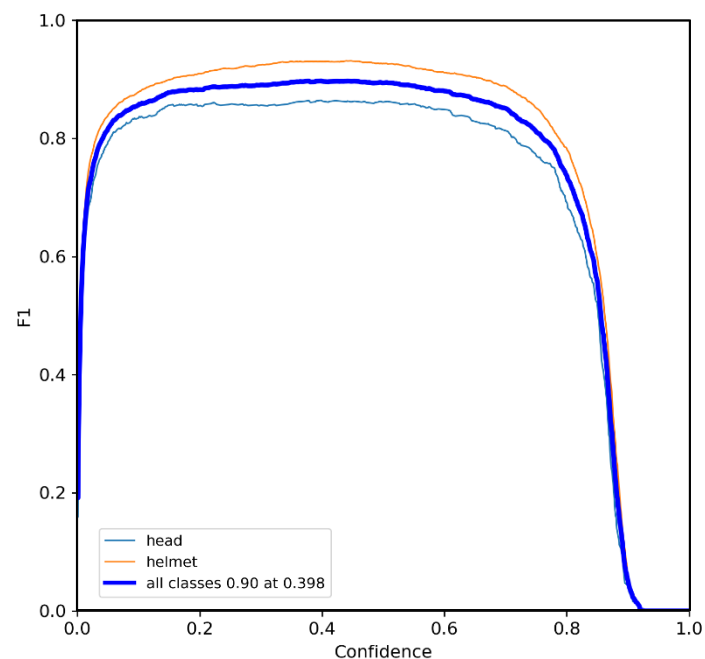
- runs/val/result_val 폴더에 검증 결과 저장
- Confusion Matrix, PR Curve, F1 Curve 등 성능 지표 확인 가능



Confusion Matrix



PR Curve



F1 curve

감사합니다