

((실습)) YOLO5를 이용한 마스크 인식

[1] Mask 데이터 준비

ailab.silla.ac.kr/lec/pipaai/roboflow.zip 마스크데이터셋 다운로드 하기

(원본데이터 출처: <https://public.roboflow.com/object-detection/mask-wearing/>)

윈도우즈 탐색기로 c:\ai\mask\datasets\roboflow 폴더에 압축 풀기

[2] Anaconda Prompt에서 가상환경 설정

c:

cd \ai

md mask

cd mask

conda create -n yolov5mask git

(base) conda activate yolov5mask

[3] 관련 패키지 설치

```
(yolov5mask) c:\ai\mask> git clone https://github.com/ultralytics/yolov5.git
((( ※ ai\mask 폴더 아래에 datasets 폴더와 새로 다운받은 yolov5 폴더가 같이 존재해야 함)))

# install Lib for YOLOv5
(yolov5mask) c:\ai\mask>conda install -c anaconda cython numpy pillow scipy
seaborn pandas requests
(yolov5mask) c:\ai\mask>conda install -c conda-forge matplotlib pyyaml tensorboard
tqdm opencv

# install pytorch (GPU 설치시)
(yolov5mask) c:\ai\mask>conda install pytorch torchvision torchaudio cudatoolkit=10.2
-c pytorch

# install pytorch (GPU 미설치시)
(yolov5mask) c:\ai\mask>conda install pytorch torchvision torchaudio cpuonly -c
pytorch

# Extra
(yolov5mask) c:\ai\mask>conda install -c conda-forge onnx
```

pytorch.org

opencv강좌 컨볼루션 신경망 레... 영상처리와 기계학... Total confirmed ca... 인터넷

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INSTALL PYTORCH

Select your preferences and run the install command. Stable represents the most currently tested and supported version of PyTorch. This should be suitable for many users. Preview is available if you want the latest, not fully tested and supported, 1.10 builds that are generated nightly. Please ensure that you have **met the prerequisites below (e.g., numpy)**, depending on your package manager. Anaconda is our recommended package manager since it installs all dependencies. You can also [install previous versions of PyTorch](#). Note that LibTorch is only available for C++.

Additional support or warranty for some PyTorch Stable and LTS binaries are available through the [PyTorch Enterprise Support Program](#).

PyTorch Build	Stable (1.9.0)	Preview (Nightly)	LTS (1.8.1)	
Your OS	Linux	Mac	Windows	
Package	Conda	Pip	LibTorch	Source
Language	Python		C++ / Java	
Compute Platform	CUDA 10.2	CUDA 11.1	ROCm 4.2 (beta)	CPU
Run this Command:	conda install pytorch torchvision torchaudio cpuonly -c pytorch			

Previous versions of PyTorch >

[4] roboflow.yaml 파일 다운받아 설정

학습용과 검증용 이미지 파일위치정보를 담은 yaml 파일 다운받아 설정

ailab 사이트에서 다운받은 roboflow.yaml 파일을, ai\mask\yolov5\data 폴더에 저장한다.

```
! roboflow.yaml × ! coco128.yaml train.py 5 ●
D: > myprojects > yolov51 > data > ! roboflow.yaml
1 # COCO 2017 dataset http://cocodataset.org - first 128 training images
2 # Train command: python train.py --data coco128.yaml
3 # Default dataset location is next to YOLOv5:
4 # /parent
5 # /datasets/coco128
6 # /yolov5
7
8
9 # Train/val/test sets as 1) dir: path/to/imgs, 2) file: path/to/imgs.txt, or 3) list
10 path: ../datasets/roboflow # dataset root dir
11 train: images/train # train images (relative to 'path') 128 images
12 val: images/valid # val images (relative to 'path') 128 images
13 test: images/test # test images (optional)
14
15 # Classes
16 nc: 2 # number of classes
17 names: [ 'NO mask', 'Mask' ] # class names
18
19
20 # Download script/URL (optional)
21 #download: https://github.com/ultralytics/yolov5/releases/download/v1.0/coco128.zip
```

[5] 학습하기

python train.py --img 640 --batch 4 --epochs 40 --data data/roboflow.yaml --cfg models/yolov5s.yaml --weights yolov5s.pt

```
관리자: Anaconda Prompt (Anaconda30) - conda install -c anaconda cython numpy pillow scipy seaborn pandas requests - conda install -c conda...
Class      Images  Labels    P      R      mAP@.5  mAP@.5:.95: 100%| 4/4 [00:00<00:00, 8.32
all        29      162      0.109   0.144   0.0754   0.0182

Epoch 6/9  gpu_mem  box      obj      cls      total  labels  img_size
1.26G      0.08786  0.09218  0.02163  0.2017  2       640: 100%| 27/27 [00:02<00:00, 9.99it/s
Class      Images  Labels    P      R      mAP@.5  mAP@.5:.95: 100%| 4/4 [00:00<00:00, 8.30
all        29      162      0.128   0.18    0.0971   0.0213

Epoch 7/9  gpu_mem  box      obj      cls      total  labels  img_size
1.26G      0.08282  0.08994  0.02103  0.1938  3       640: 100%| 27/27 [00:02<00:00, 9.92it/s
Class      Images  Labels    P      R      mAP@.5  mAP@.5:.95: 100%| 4/4 [00:00<00:00, 8.52
all        29      162      0.685   0.162   0.131    0.031

Epoch 8/9  gpu_mem  box      obj      cls      total  labels  img_size
1.26G      0.07965  0.09079  0.02022  0.1907  13      640: 100%| 27/27 [00:02<00:00, 10.01it/s
Class      Images  Labels    P      R      mAP@.5  mAP@.5:.95: 100%| 4/4 [00:00<00:00, 8.89
all        29      162      0.698   0.183   0.154    0.0409

Epoch 9/9  gpu_mem  box      obj      cls      total  labels  img_size
1.26G      0.07709  0.08271  0.01959  0.1794  11      640: 100%| 27/27 [00:02<00:00, 9.84it/s
Class      Images  Labels    P      R      mAP@.5  mAP@.5:.95: 100%| 4/4 [00:00<00:00, 5.37
all        29      162      0.726   0.162   0.174    0.0492
mask      29      142      0.453   0.324   0.311    0.0879
NoMask    29      20       1       0       0.0361    0.0106

10 epochs completed in 0.011 hours.

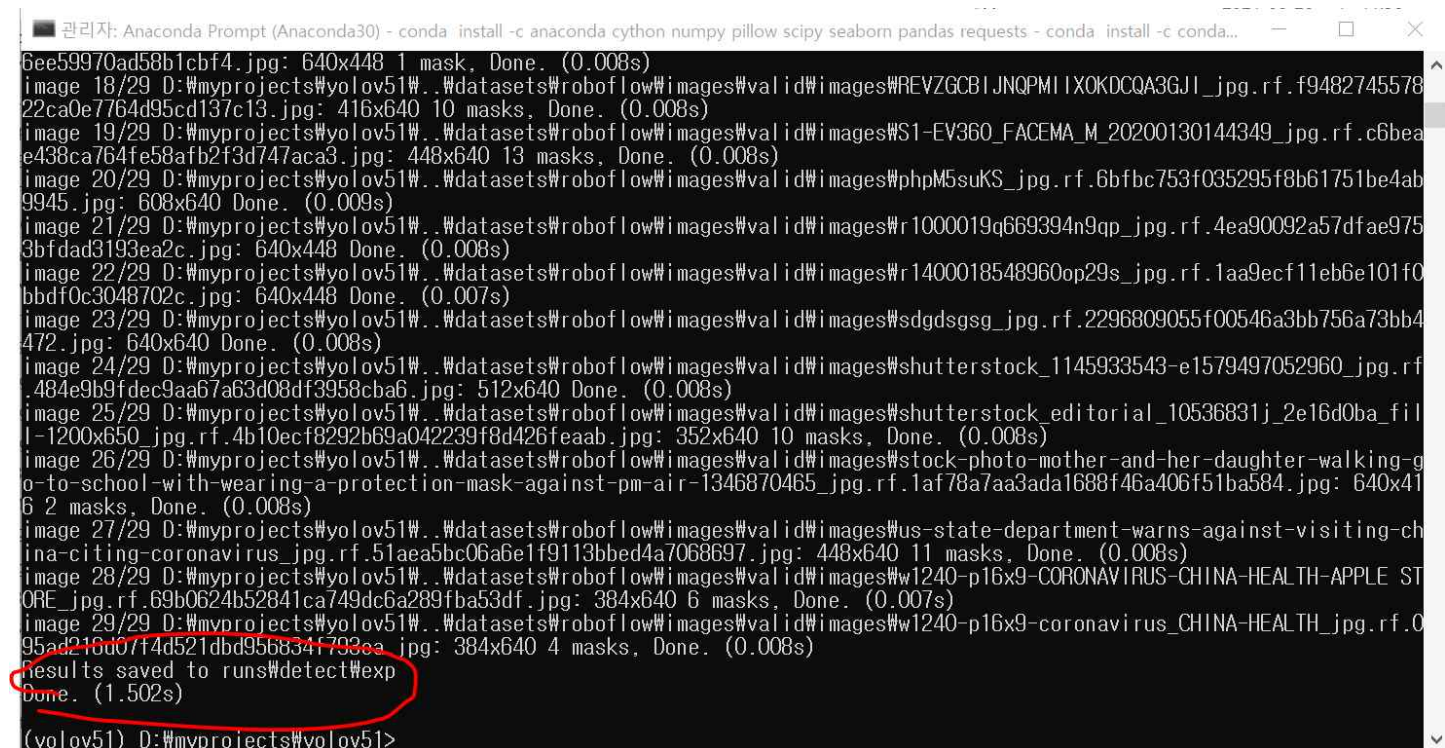
Optimizer stripped from runs\train\exp2\weights\last.pt, 14.4MB
Optimizer stripped from runs\train\exp2\weights\best.pt, 14.4MB
```

[6-1] 기존(다운로드) 학습한 정보로 실행

```
python detect.py --source ./inference/images/ --weights yolov5s.pt --conf 0.2
```

[6-2] 새로이 학습한 정보로 실행 (폴더내 이미지 입력시)

```
python detect.py --source ../datasets/roboflow/images/valid/images/ --weights  
runs/train/exp?/weights/best.pt --conf 0.2
```



```
관리자: Anaconda Prompt (Anaconda30) - conda install -c anaconda cython numpy pillow scipy seaborn pandas requests - conda install -c conda...  
6ee59970ad58b1cbf4.jpg: 640x448 1 mask, Done. (0.008s)  
image 18/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\REVZGCB1JNQPM11X0KDCQA3GJI.jpg.rf.f9482745578  
22ca0e7764d95cd137c13.jpg: 416x640 10 masks, Done. (0.008s)  
image 19/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\S1-EV360_FACEMA_M_20200130144349.jpg.rf.c6bea  
e438ca764fe58afb2f3d747aca3.jpg: 448x640 13 masks, Done. (0.008s)  
image 20/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\phpM5suKS.jpg.rf.6bfbc753f035295f8b61751be4ab  
9945.jpg: 608x640 Done. (0.009s)  
image 21/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\r1000019q669394n9qp.jpg.rf.4ea90092a57dfae975  
3bfdad3193ea2c.jpg: 640x448 Done. (0.008s)  
image 22/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\r1400018548960op29s.jpg.rf.1aa9ecf11eb6e101f0  
bbdf0c3048702c.jpg: 640x448 Done. (0.007s)  
image 23/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\sdgdsqsg.jpg.rf.2296809055f00546a3bb756a73bb4  
472.jpg: 640x640 Done. (0.008s)  
image 24/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\shutterstock_1145933543-e1579497052960.jpg.rf  
.484e9b9fdec9aa67a63d08df3958cba6.jpg: 512x640 Done. (0.008s)  
image 25/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\shutterstock_editorial_10536831j_2e16d0ba_fil  
l-1200x650.jpg.rf.4b10ecf8292b69a042239f8d426feaab.jpg: 352x640 10 masks, Done. (0.008s)  
image 26/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\stock-photo-mother-and-her-daughter-walking-g  
o-to-school-with-wearing-a-protection-mask-against-pm-air-1346870465.jpg.rf.1af78a7aa3ada1688f46a406f51ba584.jpg: 640x41  
6 2 masks, Done. (0.008s)  
image 27/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\us-state-department-warns-against-visiting-ch  
ina-citing-coronavirus.jpg.rf.51aea5bc06a6e1f9113bbcd4a7068697.jpg: 448x640 11 masks, Done. (0.008s)  
image 28/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\w1240-p16x9-CORONAVIRUS-CHINA-HEALTH-APPLE ST  
ORE.jpg.rf.69b0624b52841ca749dc6a289fba53df.jpg: 384x640 6 masks, Done. (0.007s)  
image 29/29 D:\myprojects\yolov51\..\datasets\roboflow\images\valid\images\w1240-p16x9-coronavirus_CHINA-HEALTH.jpg.rf.0  
95ad216d07f4d521dbd956834f793ea.jpg: 384x640 4 masks, Done. (0.008s)  
results saved to runs\detect\exp  
Done. (1.502s)  
(yolov51) D:\myprojects\yolov51>
```

결과는 runs\detect\exp? 폴더에 저장

[6-3] 새로이 학습한 정보로 실행 (웹캠 입력시)

```
python detect.py --source 0 --weights runs/train/exp?/weights/best.pt --conf 0.2
```

※ 마스크 착용한 데이터의 비중이 큼

((실습)) YOLO5를 이용한 차량 및 번호판 인식

[1] 차량 데이터 학습

학습사이트에서 cars.zip 차량 이미지데이터와 annotation파일들을 다운로드 하여 datasets/car 폴더에 압축을 푼다

학습사이트에서 car.yaml을 다운로드하여 yolov5\data폴더에 저장한다

```
! car.yaml  X  train.py  ●
D: > myprojects > yolov51 > data > ! car.yaml
1  # COCO 2017 dataset http://cocodataset.org - first 128 training images
2  # Train command: python train.py --data coco128.yaml
3  # Default dataset location is next to YOLOv5:
4  #   /parent
5  #   /datasets/coco128
6  #   /yolov5
7
8
9  # Train/val/test sets as 1) dir: path/to/imgs, 2) file: path/to/imgs.txt, or 3) List: [path]
10 path: ../datasets/car # dataset root dir
11 train: images/train # train images (relative to 'path') 128 images
12 val: images/valid # val images (relative to 'path') 128 images
13 test: images/test # test images (optional)
14
15 # Classes
16 nc: 2 # number of classes
17 names: [ 'car', 'plate' ] # class names
18
19
20 # Download script/URL (optional)
21 #download: https://github.com/ultraLytics/yolov5/releases/download/v1.0/coco128.zip
```

labelimg로 데이터에 대한 annotation파일을 구한다

아래 명령어로 학습한다.

```
python train.py --img 416 --batch 4 --epochs 20 --data data/car.yaml --cfg
models/yolov5m.yaml --weights yolov5m.pt
```

아래 명령어로 valid 폴더아래 이미지에 대하여 Test한다

```
python detect.py --source ../datasets/car/images/valid --weights
runs/train/exp14/weights/best.pt --conf 0.1
```