

과제 2 보고서

20192403 박상철

해당 과제를 풀어내기 위해 객체 인식 모델은 YOLOv5를 커스텀하여 사용하였습니다.

YOLOv5 커스텀 과정

코랩에 Yolo 및 관련 모듈 설치

```
[2]: from google.colab import drive
drive.mount('/content/drive')

# 내 구글 드라이브로 이동
%cd "/content/drive/MyDrive"

# YOLOv5 github 레포지토리 clone
!git clone https://github.com/ultralytics/yolov5.git

# 필요한 모듈 설치
!pip install -U -r yolov5/requirements.txt

import torch

#테스트하기 위한 확인, cuda device properties 확인
print('torch %s %s' % (torch.__version__, torch.cuda.get_device_properties(0) if torch.cuda.is_available() else ''))

Mounted at /content/drive
Cloning into 'yolov5'...
remote: Enumerating objects: 14088, done.
remote: Counting objects: 100% (12/12), done.
remote: Compressing objects: 100% (12/12), done.
remote: Total 14088 (delta 10), reused 11 (delta 1), pack-reused 14056
Receiving objects: 100% (14088/14088), 14.45 MiB | 0.58 MiB/s, done.
Resolving deltas: 100% (11042/11042), done.
Collecting gitpython>=3.1.30 (from -r yolov5/requirements.txt (line 5))
  Downloading GitPython-3.1.40-py3-none-any.whl (139 kB)
Requirement already satisfied: matplotlib>=3.3.0 in /usr/local/lib/python3.10/dist-packages (from -r yo
Collecting matplotlib>=3.3.0 (from -r yolov5/requirements.txt (line 6))
  Downloading matplotlib-3.6.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.6 MB)
Requirement already satisfied: numpy>=1.22.2 in /usr/local/lib/python3.10/dist-packages (from -r yolo
Collecting numpy>=1.22.2 (from -r yolov5/requirements.txt (line 7))
  Downloading numpy-1.26.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (18.2 MB)
Requirement already satisfied: opencv-python>=4.1.1 in /usr/local/lib/python3.10/dist-packages (from
Collecting opencv-python>=4.1.1 (from -r yolov5/requirements.txt (line 8))
  Downloading opencv-python-4.11.78-cp37-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (61.7 M
Collecting Pillow>=10.0.1 (from -r yolov5/requirements.txt (line 9))
  Downloading Pillow-10.1.0-cp310-cp310-manylinux_2_17_x86_64.whl (3.4 MB)
Installing collected packages: gitpython, matplotlib, numpy, opencv-python, Pillow
Successfully installed gitpython-3.1.40 matplotlib-3.6.2 numpy-1.26.2 opencv-python-4.11.78 Pillow-10.1.0
실행 중 (175) <cell line 1>: system() _system_command() _run_command() _monitor_process() _poll_process()
```

데이터셋 세팅

```
[2]: !rm -rf yolov5/empire_yolo
!rm -rf yolov5/train.txt
!rm -rf yolov5/valid.txt

[4]: !unzip -qq "/content/empire_yolo.zip"

#테스트할 이미지 목록
train_img_list = glob('/content/yolov5/empire_yolo/train/*.jpg') + glob('/content/yolov5/empire_yo
valid_img_list = glob('/content/yolov5/empire_yolo/valid/*.jpg') + glob('/content/yolov5/empire_yo

# txt 파일에 write
with open('train.txt', 'w') as f:
    f.write('\n'.join(train_img_list) + '\n')

with open('valid.txt', 'w') as f:
    f.write('\n'.join(valid_img_list) + '\n')
```

커스텀 진행

```
python /content/yolov5/train.py --img 640 --batch 16 --epochs 150 --data /content/yolov5/empire_yo

2023-12-04 12:55:58.048029: E tensorflow/compiler/xla/stream_executor/cuda/cuda_dnn.cc:9342] Unable t
2023-12-04 12:55:58.048092: E tensorflow/compiler/xla/stream_executor/cuda/cuda_fft.cc:605] Unable t
2023-12-04 12:55:58.048095: E tensorflow/compiler/xla/stream_executor/cuda/cuda_blas.cc:1538] Unable
train: weights=yolov5s.pt, cfg=, data=/content/yolov5/empire_yolo/data.yaml, hyp=yolov5/data/hyps/hyp
github: up to date with https://github.com/ultralytics/yolov5
YOLOv5 v7.0-247-g5f262de Python-3.10.12 torch-2.1.0-cu121 CUDA:0 (Tesla T4, 15102MiB)

Hyperparameters: lr0=0.01, lr1=0.01, lr2=0.01, lr3=0.01, lr4=0.01, lr5=0.01, lr6=0.01, lr7=0.01, lr8=0.01, lr9=0.01, lr10=0.01, lr11=0.01, lr12=0.01, lr13=0.01, lr14=0.01, lr15=0.01, lr16=0.01, lr17=0.01, lr18=0.01, lr19=0.01, lr20=0.01, lr21=0.01, lr22=0.01, lr23=0.01, lr24=0.01, lr25=0.01, lr26=0.01, lr27=0.01, lr28=0.01, lr29=0.01, lr30=0.01, lr31=0.01, lr32=0.01, lr33=0.01, lr34=0.01, lr35=0.01, lr36=0.01, lr37=0.01, lr38=0.01, lr39=0.01, lr40=0.01, lr41=0.01, lr42=0.01, lr43=0.01, lr44=0.01, lr45=0.01, lr46=0.01, lr47=0.01, lr48=0.01, lr49=0.01, lr50=0.01, lr51=0.01, lr52=0.01, lr53=0.01, lr54=0.01, lr55=0.01, lr56=0.01, lr57=0.01, lr58=0.01, lr59=0.01, lr60=0.01, lr61=0.01, lr62=0.01, lr63=0.01, lr64=0.01, lr65=0.01, lr66=0.01, lr67=0.01, lr68=0.01, lr69=0.01, lr70=0.01, lr71=0.01, lr72=0.01, lr73=0.01, lr74=0.01, lr75=0.01, lr76=0.01, lr77=0.01, lr78=0.01, lr79=0.01, lr80=0.01, lr81=0.01, lr82=0.01, lr83=0.01, lr84=0.01, lr85=0.01, lr86=0.01, lr87=0.01, lr88=0.01, lr89=0.01, lr90=0.01, lr91=0.01, lr92=0.01, lr93=0.01, lr94=0.01, lr95=0.01, lr96=0.01, lr97=0.01, lr98=0.01, lr99=0.01, lr100=0.01, lr101=0.01, lr102=0.01, lr103=0.01, lr104=0.01, lr105=0.01, lr106=0.01, lr107=0.01, lr108=0.01, lr109=0.01, lr110=0.01, lr111=0.01, lr112=0.01, lr113=0.01, lr114=0.01, lr115=0.01, lr116=0.01, lr117=0.01, lr118=0.01, lr119=0.01, lr120=0.01, lr121=0.01, lr122=0.01, lr123=0.01, lr124=0.01, lr125=0.01, lr126=0.01, lr127=0.01, lr128=0.01, lr129=0.01, lr130=0.01, lr131=0.01, lr132=0.01, lr133=0.01, lr134=0.01, lr135=0.01, lr136=0.01, lr137=0.01, lr138=0.01, lr139=0.01, lr140=0.01, lr141=0.01, lr142=0.01, lr143=0.01, lr144=0.01, lr145=0.01, lr146=0.01, lr147=0.01, lr148=0.01, lr149=0.01, lr150=0.01, lr151=0.01, lr152=0.01, lr153=0.01, lr154=0.01, lr155=0.01, lr156=0.01, lr157=0.01, lr158=0.01, lr159=0.01, lr160=0.01, lr161=0.01, lr162=0.01, lr163=0.01, lr164=0.01, lr165=0.01, lr166=0.01, lr167=0.01, lr168=0.01, lr169=0.01, lr170=0.01, lr171=0.01, lr172=0.01, lr173=0.01, lr174=0.01, lr175=0.01, lr176=0.01, lr177=0.01, lr178=0.01, lr179=0.01, lr180=0.01, lr181=0.01, lr182=0.01, lr183=0.01, lr184=0.01, lr185=0.01, lr186=0.01, lr187=0.01, lr188=0.01, lr189=0.01, lr190=0.01, lr191=0.01, lr192=0.01, lr193=0.01, lr194=0.01, lr195=0.01, lr196=0.01, lr197=0.01, lr198=0.01, lr199=0.01, lr200=0.01, lr201=0.01, lr202=0.01, lr203=0.01, lr204=0.01, lr205=0.01, lr206=0.01, lr207=0.01, lr208=0.01, lr209=0.01, lr210=0.01, lr211=0.01, lr212=0.01, lr213=0.01, lr214=0.01, lr215=0.01, lr216=0.01, lr217=0.01, lr218=0.01, lr219=0.01, lr220=0.01, lr221=0.01, lr222=0.01, lr223=0.01, lr224=0.01, lr225=0.01, lr226=0.01, lr227=0.01, lr228=0.01, lr229=0.01, lr230=0.01, lr231=0.01, lr232=0.01, lr233=0.01, lr234=0.01, lr235=0.01, lr236=0.01, lr237=0.01, lr238=0.01, lr239=0.01, lr240=0.01, lr241=0.01, lr242=0.01, lr243=0.01, lr244=0.01, lr245=0.01, lr246=0.01, lr247=0.01, lr248=0.01, lr249=0.01, lr250=0.01, lr251=0.01, lr252=0.01, lr253=0.01, lr254=0.01, lr255=0.01, lr256=0.01, lr257=0.01, lr258=0.01, lr259=0.01, lr260=0.01, lr261=0.01, lr262=0.01, lr263=0.01, lr264=0.01, lr265=0.01, lr266=0.01, lr267=0.01, lr268=0.01, lr269=0.01, lr270=0.01, lr271=0.01, lr272=0.01, lr273=0.01, lr274=0.01, lr275=0.01, lr276=0.01, lr277=0.01, lr278=0.01, lr279=0.01, lr280=0.01, lr281=0.01, lr282=0.01, lr283=0.01, lr284=0.01, lr285=0.01, lr286=0.01, lr287=0.01, lr288=0.01, lr289=0.01, lr290=0.01, lr291=0.01, lr292=0.01, lr293=0.01, lr294=0.01, lr295=0.01, lr296=0.01, lr297=0.01, lr298=0.01, lr299=0.01, lr300=0.01, lr301=0.01, lr302=0.01, lr303=0.01, lr304=0.01, lr305=0.01, lr306=0.01, lr307=0.01, lr308=0.01, lr309=0.01, lr310=0.01, lr311=0.01, lr312=0.01, lr313=0.01, lr314=0.01, lr315=0.01, lr316=0.01, lr317=0.01, lr318=0.01, lr319=0.01, lr320=0.01, lr321=0.01, lr322=0.01, lr323=0.01, lr324=0.01, lr325=0.01, lr326=0.01, lr327=0.01, lr328=0.01, lr329=0.01, lr330=0.01, lr331=0.01, lr332=0.01, lr333=0.01, lr334=0.01, lr335=0.01, lr336=0.01, lr337=0.01, lr338=0.01, lr339=0.01, lr340=0.01, lr341=0.01, lr342=0.01, lr343=0.01, lr344=0.01, lr345=0.01, lr346=0.01, lr347=0.01, lr348=0.01, lr349=0.01, lr350=0.01, lr351=0.01, lr352=0.01, lr353=0.01, lr354=0.01, lr355=0.01, lr356=0.01, lr357=0.01, lr358=0.01, lr359=0.01, lr360=0.01, lr361=0.01, lr362=0.01, lr363=0.01, lr364=0.01, lr365=0.01, lr366=0.01, lr367=0.01, lr368=0.01, lr369=0.01, lr370=0.01, lr371=0.01, lr372=0.01, lr373=0.01, lr374=0.01, lr375=0.01, lr376=0.01, lr377=0.01, lr378=0.01, lr379=0.01, lr380=0.01, lr381=0.01, lr382=0.01, lr383=0.01, lr384=0.01, lr385=0.01, lr386=0.01, lr387=0.01, lr388=0.01, lr389=0.01, lr390=0.01, lr391=0.01, lr392=0.01, lr393=0.01, lr394=0.01, lr395=0.01, lr396=0.01, lr397=0.01, lr398=0.01, lr399=0.01, lr400=0.01, lr401=0.01, lr402=0.01, lr403=0.01, lr404=0.01, lr405=0.01, lr406=0.01, lr407=0.01, lr408=0.01, lr409=0.01, lr410=0.01, lr411=0.01, lr412=0.01, lr413=0.01, lr414=0.01, lr415=0.01, lr416=0.01, lr417=0.01, lr418=0.01, lr419=0.01, lr420=0.01, lr421=0.01, lr422=0.01, lr423=0.01, lr424=0.01, lr425=0.01, lr426=0.01, lr427=0.01, lr428=0.01, lr429=0.01, lr430=0.01, lr431=0.01, lr432=0.01, lr433=0.01, lr434=0.01, lr435=0.01, lr436=0.01, lr437=0.01, lr438=0.01, lr439=0.01, lr440=0.01, lr441=0.01, lr442=0.01, lr443=0.01, lr444=0.01, lr445=0.01, lr446=0.01, lr447=0.01, lr448=0.01, lr449=0.01, lr450=0.01, lr451=0.01, lr452=0.01, lr453=0.01, lr454=0.01, lr455=0.01, lr456=0.01, lr457=0.01, lr458=0.01, lr459=0.01, lr460=0.01, lr461=0.01, lr462=0.01, lr463=0.01, lr464=0.01, lr465=0.01, lr466=0.01, lr467=0.01, lr468=0.01, lr469=0.01, lr470=0.01, lr471=0.01, lr472=0.01, lr473=0.01, lr474=0.01, lr475=0.01, lr476=0.01, lr477=0.01, lr478=0.01, lr479=0.01, lr480=0.01, lr481=0.01, lr482=0.01, lr483=0.01, lr484=0.01, lr485=0.01, lr486=0.01, lr487=0.01, lr488=0.01, lr489=0.01, lr490=0.01, lr491=0.01, lr492=0.01, lr493=0.01, lr494=0.01, lr495=0.01, lr496=0.01, lr497=0.01, lr498=0.01, lr499=0.01, lr500=0.01, lr501=0.01, lr502=0.01, lr503=0.01, lr504=0.01, lr505=0.01, lr506=0.01, lr507=0.01, lr508=0.01, lr509=0.01, lr510=0.01, lr511=0.01, lr512=0.01, lr513=0.01, lr514=0.01, lr515=0.01, lr516=0.01, lr517=0.01, lr518=0.01, lr519=0.01, lr520=0.01, lr521=0.01, lr522=0.01, lr523=0.01, lr524=0.01, lr525=0.01, lr526=0.01, lr527=0.01, lr528=0.01, lr529=0.01, lr530=0.01, lr531=0.01, lr532=0.01, lr533=0.01, lr534=0.01, lr535=0.01, lr536=0.01, lr537=0.01, lr538=0.01, lr539=0.01, lr540=0.01, lr541=0.01, lr542=0.01, lr543=0.01, lr544=0.01, lr545=0.01, lr546=0.01, lr547=0.01, lr548=0.01, lr549=0.01, lr550=0.01, lr551=0.01, lr552=0.01, lr553=0.01, lr554=0.01, lr555=0.01, lr556=0.01, lr557=0.01, lr558=0.01, lr559=0.01, lr560=0.01, lr561=0.01, lr562=0.01, lr563=0.01, lr564=0.01, lr565=0.01, lr566=0.01, lr567=0.01, lr568=0.01, lr569=0.01, lr570=0.01, lr571=0.01, lr572=0.01, lr573=0.01, lr574=0.01, lr575=0.01, lr576=0.01, lr577=0.01, lr578=0.01, lr579=0.01, lr580=0.01, lr581=0.01, lr582=0.01, lr583=0.01, lr584=0.01, lr585=0.01, lr586=0.01, lr587=0.01, lr588=0.01, lr589=0.01, lr590=0.01, lr591=0.01, lr592=0.01, lr593=0.01, lr594=0.01, lr595=0.01, lr596=0.01, lr597=0.01, lr598=0.01, lr599=0.01, lr600=0.01, lr601=0.01, lr602=0.01, lr603=0.01, lr604=0.01, lr605=0.01, lr606=0.01, lr607=0.01, lr608=0.01, lr609=0.01, lr610=0.01, lr611=0.01, lr612=0.01, lr613=0.01, lr614=0.01, lr615=0.01, lr616=0.01, lr617=0.01, lr618=0.01, lr619=0.01, lr620=0.01, lr621=0.01, lr622=0.01, lr623=0.01, lr624=0.01, lr625=0.01, lr626=0.01, lr627=0.01, lr628=0.01, lr629=0.01, lr630=0.01, lr631=0.01, lr632=0.01, lr633=0.01, lr634=0.01, lr635=0.01, lr636=0.01, lr637=0.01, lr638=0.01, lr639=0.01, lr640=0.01, lr641=0.01, lr642=0.01, lr643=0.01, lr644=0.01, lr645=0.01, lr646=0.01, lr647=0.01, lr648=0.01, lr649=0.01, lr650=0.01, lr651=0.01, lr652=0.01, lr653=0.01, lr654=0.01, lr655=0.01, lr656=0.01, lr657=0.01, lr658=0.01, lr659=0.01, lr660=0.01, lr661=0.01, lr662=0.01, lr663=0.01, lr664=0.01, lr665=0.01, lr666=0.01, lr667=0.01, lr668=0.01, lr669=0.01, lr670=0.01, lr671=0.01, lr672=0.01, lr673=0.01, lr674=0.01, lr675=0.01, lr676=0.01, lr677=0.01, lr678=0.01, lr679=0.01, lr680=0.01, lr681=0.01, lr682=0.01, lr683=0.01, lr684=0.01, lr685=0.01, lr686=0.01, lr687=0.01, lr688=0.01, lr689=0.01, lr690=0.01, lr691=0.01, lr692=0.01, lr693=0.01, lr694=0.01, lr695=0.01, lr696=0.01, lr697=0.01, lr698=0.01, lr699=0.01, lr700=0.01, lr701=0.01, lr702=0.01, lr703=0.01, lr704=0.01, lr705=0.01, lr706=0.01, lr707=0.01, lr708=0.01, lr709=0.01, lr710=0.01, lr711=0.01, lr712=0.01, lr713=0.01, lr714=0.01, lr715=0.01, lr716=0.01, lr717=0.01, lr718=0.01, lr719=0.01, lr720=0.01, lr721=0.01, lr722=0.01, lr723=0.01, lr724=0.01, lr725=0.01, lr726=0.01, lr727=0.01, lr728=0.01, lr729=0.01, lr730=0.01, lr731=0.01, lr732=0.01, lr733=0.01, lr734=0.01, lr735=0.01, lr736=0.01, lr737=0.01, lr738=0.01, lr739=0.01, lr740=0.01, lr741=0.01, lr742=0.01, lr743=0.01, lr744=0.01, lr745=0.01, lr746=0.01, lr747=0.01, lr748=0.01, lr749=0.01, lr750=0.01, lr751=0.01, lr752=0.01, lr753=0.01, lr754=0.01, lr755=0.01, lr756=0.01, lr757=0.01, lr758=0.01, lr759=0.01, lr760=0.01, lr761=0.01, lr762=0.01, lr763=0.01, lr764=0.01, lr765=0.01, lr766=0.01, lr767=0.01, lr768=0.01, lr769=0.01, lr770=0.01, lr771=0.01, lr772=0.01, lr773=0.01, lr774=0.01, lr775=0.01, lr776=0.01, lr777=0.01, lr778=0.01, lr779=0.01, lr780=0.01, lr781=0.01, lr782=0.01, lr783=0.01, lr784=0.01, lr785=0.01, lr786=0.01, lr787=0.01, lr788=0.01, lr789=0.01, lr790=0.01, lr791=0.01, lr792=0.01, lr793=0.01, lr794=0.01, lr795=0.01, lr796=0.01, lr797=0.01, lr798=0.01, lr799=0.01, lr800=0.01, lr801=0.01, lr802=0.01, lr803=0.01, lr804=0.01, lr805=0.01, lr806=0.01, lr807=0.01, lr808=0.01, lr809=0.01, lr810=0.01, lr811=0.01, lr812=0.01, lr813=0.01, lr814=0.01, lr815=0.01, lr816=0.01, lr817=0.01, lr818=0.01, lr819=0.01, lr820=0.01, lr821=0.01, lr822=0.01, lr823=0.01, lr824=0.01, lr825=0.01, lr826=0.01, lr827=0.01, lr828=0.01, lr829=0.01, lr830=0.01, lr831=0.01, lr832=0.01, lr833=0.01, lr834=0.01, lr835=0.01, lr836=0.01, lr837=0.01, lr838=0.01, lr839=0.01, lr840=0.01, lr841=0.01, lr842=0.01, lr843=0.01, lr844=0.01, lr845=0.01, lr846=0.01, lr847=0.01, lr848=0.01, lr849=0.01, lr850=0.01, lr851=0.01, lr852=0.01, lr853=0.01, lr854=0.01, lr855=0.01, lr856=0.01, lr857=0.01, lr858=0.01, lr859=0.01, lr860=0.01, lr861=0.01, lr862=0.01, lr863=0.01, lr864=0.01, lr865=0.01, lr866=0.01, lr867=0.01, lr868=0.01, lr869=0.01, lr870=0.01, lr871=0.01, lr872=0.01, lr873=0.01, lr874=0.01, lr875=0.01, lr876=0.01, lr877=0.01, lr878=0.01, lr879=0.01, lr880=0.01, lr881=0.01, lr882=0.01, lr883=0.01, lr884=0.01, lr885=0.01, lr886=0.01, lr887=0.01, lr888=0.01, lr889=0.01, lr890=0.01, lr891=0.01, lr892=0.01, lr893=0.01, lr894=0.01, lr895=0.01, lr896=0.01, lr897=0.01, lr898=0.01, lr899=0.01, lr900=0.01, lr901=0.01, lr902=0.01, lr903=0.01, lr904=0.01, lr905=0.01, lr906=0.01, lr907=0.01, lr908=0.01, lr909=0.01, lr910=0.01, lr911=0.01, lr912=0.01, lr913=0.01, lr914=0.01, lr915=0.01, lr916=0.01, lr917=0.01, lr918=0.01, lr919=0.01, lr920=0.01, lr921=0.01, lr922=0.01, lr923=0.01, lr924=0.01, lr925=0.01, lr926=0.01, lr927=0.01, lr928=0.01, lr929=0.01, lr930=0.01, lr931=0.01, lr932=0.01, lr933=0.01, lr934=0.01, lr935=0.01, lr936=0.01, lr937=0.01, lr938=0.01, lr939=0.01, lr940=0.01, lr941=0.01, lr942=0.01, lr943=0.01, lr944=0.01, lr945=0.01, lr946=0.01, lr947=0.01, lr948=0.01, lr949=0.01, lr950=0.01, lr951=0.01, lr952=0.01, lr953=0.01, lr954=0.01, lr955=0.01, lr956=0.01, lr957=0.01, lr958=0.01, lr959=0.01, lr960=0.01, lr961=0.01, lr962=0.01, lr963=0.01, lr964=0.01, lr965=0.01, lr966=0.01, lr967=0.01, lr968=0.01, lr969=0.01, lr970=0.01, lr971=0.01, lr972=0.01, lr973=0.01, lr974=0.01, lr975=0.01, lr976=0.01, lr977=0.01, lr978=0.01, lr979=0.01, lr980=0.01, lr981=0.01, lr982=0.01, lr983=0.01, lr984=0.01, lr985=0.01, lr986=0.01, lr987=0.01, lr988=0.01, lr989=0.01, lr990=0.01, lr991=0.01, lr992=0.01, lr993=0.01, lr994=0.01, lr995=0.01, lr996=0.01, lr997=0.01, lr998=0.01, lr999=0.01, lr1000=0.01, lr1001=0.01, lr1002=0.01, lr1003=0.01, lr1004=0.01, lr1005=0.01, lr1006=0.01, lr1007=0.01, lr1008=0.01, lr1009=0.01, lr1010=0.01, lr1011=0.01, lr1012=0.01, lr1013=0.01, lr1014=0.01, lr1015=0.01, lr1016=0.01, lr1017=0.01, lr1018=0.01, lr1019=0.01, lr1020=0.01, lr1021=0.01, lr1022=0.01, lr1023=0.01, lr1024=0.01, lr1025=0.01, lr1026=0.01, lr1027=0.01, lr1028=0.01, lr1029=0.01, lr1030=0.01, lr1031=0.01, lr1032=0.01, lr1033=0.01, lr1034=0.01, lr1035=0.01, lr1036=0.01, lr1037=0.01, lr1038=0.01, lr1039=0.01, lr1040=0.01, lr1041=0.01, lr1042=0.01, lr1043=0.01, lr1044=0.01, lr1045=0.01, lr1046=0.01, lr1047=0.01, lr1048=0.01, lr1049=0.01, lr1050=0.01, lr1051=0.01, lr1052=0.01, lr1053=0.01, lr1054=0.01, lr1055=0.01, lr1056=0.01, lr1057=0.01, lr1058=0.01, lr1059=0.01, lr1060=0.01, lr1061=0.01, lr1062=0.01, lr1063=
```

```

model = torch.hub.load('ultralytics/yolov5', 'custom', path='./best.pt',
force_reload=True)

img = cv.imread(imgPath)

# YOLOv5 를 통한 객체 탐지
yoloImg = model(img)

```

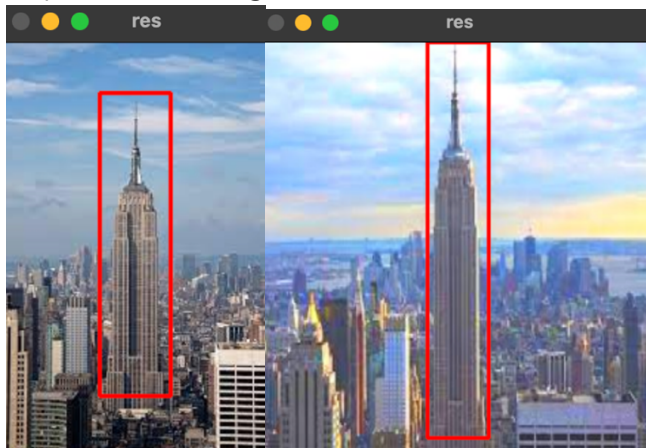
1번 과제와 2번 과제의 모든 소스가 동일하나 1번 과제는 검출한 객체 중 60프로 이상의 정확도를 가진 객체가 있다면 변수를 True로 설정하고 2번 과제에서는 사각형형을 그립니다.

```

if conf > 0.6:
    cv.rectangle(img, (int(x), int(y)), (int(w), int(h)), (0, 0, 255), 2)

```

empire state building 존재 케이스



empire state building 존재하지 않는 케이스

