

## ✓ Roboflow에서 가져온 데이터셋 사용해보기

### ✓ 1.데이터셋

- 데이터셋 라이브러리 설치하기

```
!pip install roboflow
```

```

Collecting roboflow
  Downloading roboflow-1.1.27-py3-none-any.whl (74 kB)
    74.1/74.1 kB 1.9 MB/s eta 0:00:00
Collecting certifi==2023.7.22 (from roboflow)
  Downloading certifi-2023.7.22-py3-none-any.whl (158 kB)
    158.3/158.3 kB 9.1 MB/s eta 0:00:00
Collecting chardet==4.0.0 (from roboflow)
  Downloading chardet-4.0.0-py2.py3-none-any.whl (178 kB)
    178.7/178.7 kB 9.2 MB/s eta 0:00:00
Collecting cycler==0.10.0 (from roboflow)
  Downloading cycler-0.10.0-py2.py3-none-any.whl (6.5 kB)
Collecting idna==2.10 (from roboflow)
  Downloading idna-2.10-py2.py3-none-any.whl (58 kB)
    58.8/58.8 kB 6.4 MB/s eta 0:00:00
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.10/dist-packages (
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from ro
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from
Collecting opencv-python-headless==4.8.0.74 (from roboflow)
  Downloading opencv_python_headless-4.8.0.74-cp37-abi3-manylinux_2_17_x86_64.manylinux2014_x
    49.1/49.1 MB 15.1 MB/s eta 0:00:00
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (fr
Collecting python-dotenv (from roboflow)
  Downloading python_dotenv-1.0.1-py3-none-any.whl (19 kB)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from robo
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from roboflow)
Requirement already satisfied: urllib3>=1.26.6 in /usr/local/lib/python3.10/dist-packages (fr
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.10/dist-packages (from
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from
Collecting requests-toolbelt (from roboflow)
  Downloading requests_toolbelt-1.0.0-py2.py3-none-any.whl (54 kB)
    54.5/54.5 kB 6.2 MB/s eta 0:00:00
Collecting python-magic (from roboflow)
  Downloading python_magic-0.4.27-py2.py3-none-any.whl (13 kB)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (f
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (fr
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (f
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-pac
Installing collected packages: python-magic, python-dotenv, opencv-python-headless, idna, cyc
  Attempting uninstall: opencv-python-headless
    Found existing installation: opencv-python-headless 4.9.0.80
    Uninstalling opencv-python-headless-4.9.0.80:
      Successfully uninstalled opencv-python-headless-4.9.0.80
  Attempting uninstall: idna
    Found existing installation: idna 3.6
    Uninstalling idna-3.6:
      Successfully uninstalled idna-3.6
  Attempting uninstall: cycler
    Found existing installation: cycler 0.12.1
    Uninstalling cycler-0.12.1:
      Successfully uninstalled cycler-0.12.1
  Attempting uninstall: chardet

```

- 데이터셋 라이브러리 불러오기

```
from roboflow import Roboflow
```

- 데이터셋 설치하기

```

rf = Roboflow(api_key="vZV4ItqyYGeuNdaDKbFa")
project = rf.workspace("augmented-startups").project("playing-cards-ow27d")
version = project.version(4)
dataset = version.download("yolov8")

loading Roboflow workspace...
loading Roboflow project...
[WARNING] we noticed you are downloading a `yolov8` datasets but you don't have `ultralytics` installed. Roboflow `deploy` supports only models trai
Downloading Dataset Version Zip in Playing-Cards-4 to yolov8:: 100%|██████████| 2119661/2119661 [01:04<00:00, 33065.41it/s]

Extracting Dataset Version Zip to Playing-Cards-4 in yolov8:: 100%|██████████| 48478/48478 [00:14<00:00, 3432.01it/s]

```

## 2.모델링

- 모델링 라이브러리 설치하기

```
!pip install ultralytics
```

```

Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (4.66.2)
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from ultralytics) (5.9.5)
Requirement already satisfied: py-cpuinfo in /usr/local/lib/python3.10/dist-packages (from ultralytics) (9.0.0)
Collecting thop>=0.1.1 (from ultralytics)
  Downloading thop-0.1.1.post2209072238-py3-none-any.whl (15 kB)
Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (2.0.3)
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.13.1)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.2.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (0.10.0)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (4.51.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.4.5)
Requirement already satisfied: numpy>=1.20 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.25.2)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (24.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.1.4->ultralytics) (2023.4)
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.1.4->ultralytics) (2024.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2.0.7)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2023.7.22)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.13.4)
Requirement already satisfied: typing-extensions>=4.8.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (4.11.0)
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (1.12)
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.3)
Requirement already satisfied: Jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.1.3)
Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2023.6.0)
Collecting nvidia-cuda-nvrtc-cu12==12.1.105 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cuda_nvrtc_cu12-12.1.105-py3-none-manylinux1_x86_64.whl (23.7 MB)
Collecting nvidia-cuda-runtime-cu12==12.1.105 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cuda_runtime_cu12-12.1.105-py3-none-manylinux1_x86_64.whl (823 kB)
Collecting nvidia-cuda-cupti-cu12==12.1.105 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cuda_cupti_cu12-12.1.105-py3-none-manylinux1_x86_64.whl (14.1 MB)
Collecting nvidia-cudnn-cu12==8.9.2.26 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cudnn_cu12-8.9.2.26-py3-none-manylinux1_x86_64.whl (731.7 MB)
Collecting nvidia-cublas-cu12==12.1.3.1 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cublas_cu12-12.1.3.1-py3-none-manylinux1_x86_64.whl (410.6 MB)
Collecting nvidia-cufft-cu12==11.0.2.54 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cufft_cu12-11.0.2.54-py3-none-manylinux1_x86_64.whl (121.6 MB)
Collecting nvidia-curand-cu12==10.3.2.106 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_curand_cu12-10.3.2.106-py3-none-manylinux1_x86_64.whl (56.5 MB)
Collecting nvidia-cusolver-cu12==11.4.5.107 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cusolver_cu12-11.4.5.107-py3-none-manylinux1_x86_64.whl (124.2 MB)
Collecting nvidia-cuspars-cu12==12.1.0.106 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_cuspars-cu12-12.1.0.106-py3-none-manylinux1_x86_64.whl (196.0 MB)
Collecting nvidia-nccl-cu12==2.19.3 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_nccl_cu12-2.19.3-py3-none-manylinux1_x86_64.whl (166.0 MB)
Collecting nvidia-nvtx-cu12==12.1.105 (from torch>=1.8.0->ultralytics)
  Using cached nvidia_nvtx_cu12-12.1.105-py3-none-manylinux1_x86_64.whl (99 kB)
Requirement already satisfied: triton==2.2.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2.2.0)
Collecting nvidia-nvjitlink-cu12 (from nvidia-cusolver-cu12==11.4.5.107->torch>=1.8.0->ultralytics)
  Using cached nvidia_nvjitlink_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl (21.1 MB)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from cycler>=0.10->matplotlib>=3.3.0->ultralytics) (1.16.0)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from Jinja2->torch>=1.8.0->ultralytics) (2.1.5)
Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch>=1.8.0->ultralytics) (1.3.0)
Installing collected packages: nvidia-nvtx-cu12, nvidia-nvjitlink-cu12, nvidia-nccl-cu12, nvidia-curand-cu12, nvidia-cufft-cu12, nvidia-cuda-runti
Successfully installed nvidia-cublas-cu12-12.1.3.1 nvidia-cuda-cupti-cu12-12.1.105 nvidia-cuda-nvrtc-cu12-12.1.105 nvidia-cuda-runtime-cu12-12.1.1

```

- 모델링 라이브러리 불러오기

```
from ultralytics import YOLO, settings
```

- 데이터셋 경로 수정 & YAML 파일 경로 수정

```
settings
```

```
{'settings_version': '0.0.4',
 'datasets_dir': '/content/datasets',
 'weights_dir': 'weights',
 'runs_dir': 'runs',
 'uuid': '569f3ba64b326db489132663f79cd37279811de477381b83ac131e6cdd129cbb',
 'sync': True,
 'api_key': '',
 'openai_api_key': '',
 'clearml': True,
 'comet': True,
 'dvc': True,
 'hub': True,
 'mlflow': True,
 'neptune': True,
 'raytune': True,
 'tensorboard': True,
 'wandb': True}
```

```
settings['datasets_dir'] = '/content/'
settings.update()
settings
```

```
{'settings_version': '0.0.4',
 'datasets_dir': '/content/',
 'weights_dir': 'weights',
 'runs_dir': 'runs',
 'uuid': '569f3ba64b326db489132663f79cd37279811de477381b83ac131e6cdd129cbb',
 'sync': True,
 'api_key': '',
 'openai_api_key': '',
 'clearml': True,
 'comet': True,
 'dvc': True,
 'hub': True,
 'mlflow': True,
 'neptune': True,
 'raytune': True,
 'tensorboard': True,
 'wandb': True}
```

```
import yaml
```

```
## yaml 파일 읽고 수정 필요
```

```
with open('/content/Playing-Cards-4/data.yaml', 'r+') as f:
    film = yaml.load(f, Loader=yaml.FullLoader)
    # display(film)
    film['train'] = './train/images/'
    film['val'] = './valid/images/'
```

```
with open('/content/Playing-Cards-4/data.yaml', 'w') as f:
    yaml.dump(film, f)
```

## > 1) 데이터셋에서 제공하는 모델 사용하기

[ ] 4 숨겨진 셀 4개

## > 2) 모델 구조만 빌려와서 사용해보기

[ ] 4 숨겨진 셀 6개

## ✓ 3) 모델 구조에 사전 학습 가중치도 가져와서 사용해보기

- 모델 구조 및 사전 학습 가중치 선택하기

```
model2 = YOLO(model='yolov8n.pt', task='detect')
```

Downloading <https://github.com/ultralytics/assets/releases/download/v8.1.0/yolov8n.pt> to 'yolov8n.pt'...  
100%|██████████| 6.23M/6.23M [00:00<00:00, 188MB/s]

- 모델 학습하기

```
from keras.callbacks import EarlyStopping
es = EarlyStopping(monitor = 'val_loss', min_delta = 0, patience = 0)
```

```
model2.train(data='/content/Playing-Cards-4/data.yaml',
             epochs=5,
             verbose=True,
             patience=1, # 얼리 스탑을 위한 patience 값 # early Stopping # 5번 학습하고 1번동안 개선이 없으면 멈춤
             seed=2024,
             pretrained=True)
```

0.31231,	0.31331,	0.31431,	0.31532,	0.31632,	0.31732,	0.31832,	0.31932,	0.32032,	0.32132,
0.32232,	0.32332,	0.32432,	0.32533,	0.32633,	0.32733,	0.32833,	0.32933,	0.33033,	0.33133,
0.33233,	0.33333,	0.33433,	0.33534,	0.33634,	0.33734,	0.33834,	0.33934,	0.34034,	0.34134,
0.34234,	0.34334,	0.34434,	0.34535,	0.34635,	0.34735,	0.34835,	0.34935,	0.35035,	0.35135,
0.35235,	0.35335,	0.35435,	0.35536,	0.35636,	0.35736,	0.35836,	0.35936,	0.36036,	0.36136,
0.36236,	0.36336,	0.36436,	0.36537,	0.36637,	0.36737,	0.36837,	0.36937,	0.37037,	0.37137,
0.37237,	0.37337,	0.37437,	0.37538,	0.37638,	0.37738,	0.37838,	0.37938,	0.38038,	0.38138,
0.38238,	0.38338,	0.38438,	0.38539,	0.38639,	0.38739,	0.38839,	0.38939,	0.39039,	0.39139,
0.39239,	0.39339,	0.39439,	0.3954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.4014,
0.4024,	0.4034,	0.4044,	0.40541,	0.40641,	0.40741,	0.40841,	0.40941,	0.41041,	0.41141,
0.41241,	0.41341,	0.41441,	0.41542,	0.41642,	0.41742,	0.41842,	0.41942,	0.42042,	0.42142,
0.42242,	0.42342,	0.42442,	0.42543,	0.42643,	0.42743,	0.42843,	0.42943,	0.43043,	0.43143,
0.43243,	0.43343,	0.43443,	0.43544,	0.43644,	0.43744,	0.43844,	0.43944,	0.44044,	0.44144,
0.44244,	0.44344,	0.44444,	0.44545,	0.44645,	0.44745,	0.44845,	0.44945,	0.45045,	0.45145,
0.45245,	0.45345,	0.45445,	0.45546,	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.46146,
0.46246,	0.46346,	0.46446,	0.46547,	0.46647,	0.46747,	0.46847,	0.46947,	0.47047,	0.47147,
0.47247,	0.47347,	0.47447,	0.47548,	0.47648,	0.47748,	0.47848,	0.47948,	0.48048,	0.48148,
0.48248,	0.48348,	0.48448,	0.48549,	0.48649,	0.48749,	0.48849,	0.48949,	0.49049,	0.49149,
0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.4975,	0.4985,	0.4995,	0.5005,	0.5015,
0.5025,	0.5035,	0.5045,	0.50551,	0.50651,	0.50751,	0.50851,	0.50951,	0.51051,	0.51151,
0.51251,	0.51351,	0.51451,	0.51552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.52152,
0.52252,	0.52352,	0.52452,	0.52553,	0.52653,	0.52753,	0.52853,	0.52953,	0.53053,	0.53153,
0.53253,	0.53353,	0.53453,	0.53554,	0.53654,	0.53754,	0.53854,	0.53954,	0.54054,	0.54154,
0.54254,	0.54354,	0.54454,	0.54555,	0.54655,	0.54755,	0.54855,	0.54955,	0.55055,	0.55155,
0.55255,	0.55355,	0.55455,	0.55556,	0.55656,	0.55756,	0.55856,	0.55956,	0.56056,	0.56156,
0.56256,	0.56356,	0.56456,	0.56557,	0.56657,	0.56757,	0.56857,	0.56957,	0.57057,	0.57157,
0.57257,	0.57357,	0.57457,	0.57558,	0.57658,	0.57758,	0.57858,	0.57958,	0.58058,	0.58158,
0.58258,	0.58358,	0.58458,	0.58559,	0.58659,	0.58759,	0.58859,	0.58959,	0.59059,	0.59159,
0.59259,	0.59359,	0.59459,	0.59556,	0.59656,	0.5976,	0.5986,	0.5996,	0.6006,	0.6016,
0.6026,	0.6036,	0.6046,	0.60561,	0.60661,	0.60761,	0.60861,	0.60961,	0.61061,	0.61161,
0.61261,	0.61361,	0.61461,	0.61562,	0.61662,	0.61762,	0.61862,	0.61962,	0.62062,	0.62162,
0.62262,	0.62362,	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.62963,	0.63063,	0.63163,
0.63263,	0.63363,	0.63463,	0.63564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.64164,
0.64264,	0.64364,	0.64464,	0.64565,	0.64665,	0.64765,	0.64865,	0.64965,	0.65065,	0.65165,
0.65265,	0.65365,	0.65465,	0.65566,	0.65666,	0.65766,	0.65866,	0.65966,	0.66066,	0.66166,
0.66266,	0.66366,	0.66466,	0.66567,	0.66667,	0.66767,	0.66867,	0.66967,	0.67067,	0.67167,
0.67267,	0.67367,	0.67467,	0.67568,	0.67668,	0.67768,	0.67868,	0.67968,	0.68068,	0.68168,
0.68268,	0.68368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.68969,	0.69069,	0.69169,
0.69269,	0.69369,	0.69469,	0.6957,	0.6967,	0.6977,	0.6987,	0.6997,	0.7007,	0.7017,
0.7027,	0.7037,	0.7047,	0.70571,	0.70671,	0.70771,	0.70871,	0.70971,	0.71071,	0.71171,
0.71271,	0.71371,	0.71471,	0.71572,	0.71672,	0.71772,	0.71872,	0.71972,	0.72072,	0.72172,
0.72272,	0.72372,	0.72472,	0.72573,	0.72673,	0.72773,	0.72873,	0.72973,	0.73073,	0.73173,
0.73273,	0.73373,	0.73473,	0.73574,	0.73674,	0.73774,	0.73874,	0.73974,	0.74074,	0.74174,
0.74274,	0.74374,	0.74474,	0.74575,	0.74675,	0.74775,	0.74875,	0.74975,	0.75075,	0.75175,
0.75275,	0.75375,	0.75475,	0.75576,	0.75676,	0.75776,	0.75876,	0.75976,	0.76076,	0.76176,
0.76276,	0.76376,	0.76476,	0.76577,	0.76677,	0.76777,	0.76877,	0.76977,	0.77077,	0.77177,
0.77277,	0.77377,	0.77477,	0.77578,	0.77678,	0.77778,	0.77878,	0.77978,	0.78078,	0.78178,

- 예측해보기

```
import locale
locale.getpreferredencoding = lambda: "UTF-8"
```

```
import os
os.environ["PYTHONIOENCODING"] = "utf-8"
```

```
!mkdir /content/imgs
```

```
mkdir: cannot create directory '/content/imgs': File exists
```

```
!wget -O /content/imgs/img1.jpg https://raw.githubusercontent.com/DrKAI/image/main/14th_Street_2005.jpg
```

```
!wget -O /content/imgs/img2.jpg https://raw.githubusercontent.com/DrKAI/image/main/street02.jpg
```

```
--2024-04-16 08:12:28-- https://raw.githubusercontent.com/DrKAI/image/main/14th_Street_2005.jpg
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.108.133, 185.199.109.133, 185.199.110.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 547497 (535K) [image/jpeg]
Saving to: '/content/imgs/img1.jpg'
```

```
/content/imgs/img1. 100%[=====>] 534.67K --.-KB/s in 0.02s
```

```
2024-04-16 08:12:28 (34.2 MB/s) - '/content/imgs/img1.jpg' saved [547497/547497]
```

```
--2024-04-16 08:12:28-- https://raw.githubusercontent.com/DrKAI/image/main/street02.jpg
- - - - -
```