```
!git clone https://github.com/Arijit1080/Licence-Plate-Detection-using-YOLO-V8.git
```

```
Cloning into 'Licence-Plate-Detection-using-YOLO-V8'...
remote: Enumerating objects: 133, done.
remote: Counting objects: 100% (16/16), done.
remote: Compressing objects: 100% (13/13), done.
remote: Total 133 (delta 4), reused 8 (delta 3), pack-reused 117
Receiving objects: 100% (133/133), 14.73 MiB | 11.80 MiB/s, done.
Resolving deltas: 100% (34/34), done.
```

```
cd /content/Licence-Plate-Detection-using-YOLO-V8
```

```
/content/Licence-Plate-Detection-using-YOLO-V8
```

DATASET IMPORTING

```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="L1tMkFyQ2gCUHoEIReGa")
project = rf.workspace("revanth-uzfot").project("car_ragini")
version = project.version(5)
dataset = version.download("yolov8")
```

```
Requirement already satisfied: roboflow in /usr/local/lib/python3.10/dist-packages (1.1.27)
Requirement already satisfied: certifi==2023.7.22 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2023.7.22)
Requirement already satisfied: chardet==4.0.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.0.0)
Requirement already satisfied: cycler==0.10.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.10.0)
Requirement already satisfied: idna==2.10 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.10)
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.4.5)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from roboflow) (3.7.1)
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.25.2)
Requirement already satisfied: opencv-python-headless==4.8.0.74 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.8.0.74
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from roboflow) (9.4.0)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.8.2)
Requirement already satisfied: python-dotenv in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.1)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.31.0)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.16.0)
Requirement already satisfied: urllib3>=1.26.6 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.0.7)
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.66.2)
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (6.0.1)
Requirement already satisfied: requests-toolbelt in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.0)
Requirement already satisfied: python-magic in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.4.27)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (1.2.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (4.51.0)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (24.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (3.1.2)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->roboflow) (3.3.2
loading Roboflow workspace...
loading Roboflow project...
[WARNING] we noticed you are downloading a `yolov8` datasets but you don't have `ultralytics` installed. Roboflow `.deploy` support
Downloading Dataset Version Zip in car_ragini-5 to yolov8:: 100%|██████████| 83281/83281 [00:05<00:00, 15874.72it/s]

Extracting Dataset Version Zip to car_ragini-5 in yolov8:: 100%|██████████| 4510/4510 [00:02<00:00, 1680.67it/s]
Requirement already satisfied: roboflow in /usr/local/lib/python3.10/dist-packages (1.1.27)
Requirement already satisfied: certifi==2023.7.22 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2023.7.22)
Requirement already satisfied: chardet==4.0.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.0.0)
Requirement already satisfied: cycler==0.10.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.10.0)
Requirement already satisfied: idna==2.10 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.10)
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.4.5)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from roboflow) (3.7.1)
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.25.2)
Requirement already satisfied: opencv-python-headless==4.8.0.74 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.8.0.74
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from roboflow) (9.4.0)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.8.2)
Requirement already satisfied: python-dotenv in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.1)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.31.0)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.16.0)
Requirement already satisfied: urllib3>=1.26.6 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.0.7)
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.66.2)
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (6.0.1)
Requirement already satisfied: requests-toolbelt in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.0)
Requirement already satisfied: python-magic in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.4.27)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (1.2.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (4.51.0)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (24.0)
```

```
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (3.1.2)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->roboflow) (3.3.2
loading Roboflow workspace...
loading Roboflow project...
```

INSTALLING REQUIREMENTS

```
!pip install -r /content/Licence-Plate-Detection-using-YOLO-V8/requirements.txt
```

```
Requirement already satisfied: ultralytics==8.0.3 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: hydra-core>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-u
Requirement already satisfied: opencv-python>=4.1.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Dete
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-u
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-u
Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detectio
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-us
Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-us
Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-us
Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-u
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection
Requirement already satisfied: ipython in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-using-YO
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-using-YO
Requirement already satisfied: thop>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-usi
Requirement already satisfied: GitPython>=3.1.24 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: omegaconf<2.4,>=2.2 in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r /content/
Requirement already satisfied: antlr4-python3-runtime==4.9.* in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r /content/Licence-Pl
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Lic
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Licence
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Li
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Li
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Lic
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /cont
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Licence-
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Li
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Li
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Det
Requirement already satisfied: typing-extensions>=4.8.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Detect
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Det
Requirement already satisfied: jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Dete
Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Dete
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cudnn-cu12==8.9.2.26 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /conte
Requirement already satisfied: nvidia-cublas-cu12==12.1.3.1 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /cont
Requirement already satisfied: nvidia-cufft-cu12==11.0.2.54 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /cont
Requirement already satisfied: nvidia-curand-cu12==10.3.2.106 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /co
Requirement already satisfied: nvidia-cusolver-cu12==11.4.5.107 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cusparse-cu12==12.1.0.106 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-nccl-cu12==2.19.3 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/
Requirement already satisfied: nvidia-nvtx-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /conten
Requirement already satisfied: triton==2.2.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plat
Requirement already satisfied: nvidia-nvjitlink-cu12 in /usr/local/lib/python3.10/dist-packages (from nvidia-cusolver-cu12==11.4.5.
Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.10/dist-packages (from tensorboard>=2.4.1->-r /content/Licenc
Requirement already satisfied: grpcio>=1.48.2 in /usr/local/lib/python3.10/dist-packages (from tensorboard>=2.4.1->-r /content/Lice
Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.10/dist-packages (from tensorboard>=2.4.1->-r /conte
Requirement already satisfied: google-auth-oauthlib<2,>=0.5 in /usr/local/lib/python3.10/dist-packages (from tensorboard>=2.4.1->-r
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.10/dist-packages (from tensorboard>=2.4.1->-r /content/Lic
```

YOLO MODEL TRAINING

```
!python /content/Licence-Plate-Detection-using-YOLO-V8/ultralytics/yolo/v8/detect/train.py model=yolov8n.pt data=/content/car_ragini-5/data.
```

```
yolo/engine/trainer: task=detect, mode=train, model=yolov8n.pt, data=/content/car_ragini-5/data.yaml, epochs=30, patience=50, batch
Ultralytics YOLOv8.0.3 🚀 Python-3.10.12 torch-2.2.1+cu121 CUDA:0 (Tesla T4, 15102MiB)
2024-04-13 02:38:08.924052: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:9261] Unable to register cuDNN factory: Attem
2024-04-13 02:38:08.924118: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Attempt
```

```
2024-04-13 02:38:08.926339: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: Att
2024-04-13 02:38:10.662386: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
Overriding model.yaml nc=80 with nc=983

                   from  n    params  module                                       arguments
  0                  -1  1       464  ultralytics.nn.modules.Conv                  [3, 16, 3, 2]
  1                  -1  1      4672  ultralytics.nn.modules.Conv                  [16, 32, 3, 2]
  2                  -1  1      7360  ultralytics.nn.modules.C2f                   [32, 32, 1, True]
  3                  -1  1     18560  ultralytics.nn.modules.Conv                  [32, 64, 3, 2]
  4                  -1  2     49664  ultralytics.nn.modules.C2f                   [64, 64, 2, True]
  5                  -1  1     73984  ultralytics.nn.modules.Conv                  [64, 128, 3, 2]
  6                  -1  2    197632  ultralytics.nn.modules.C2f                   [128, 128, 2, True]
  7                  -1  1    295424  ultralytics.nn.modules.Conv                  [128, 256, 3, 2]
  8                  -1  1    460288  ultralytics.nn.modules.C2f                   [256, 256, 1, True]
  9                  -1  1    164608  ultralytics.nn.modules.SPPF                  [256, 256, 5]
 10                  -1  1         0  torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']
 11             [-1, 6]  1         0  ultralytics.nn.modules.Concat                [1]
 12                  -1  1    148224  ultralytics.nn.modules.C2f                   [384, 128, 1]
 13                  -1  1         0  torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']
 14             [-1, 4]  1         0  ultralytics.nn.modules.Concat                [1]
 15                  -1  1     37248  ultralytics.nn.modules.C2f                   [192, 64, 1]
 16                  -1  1     36992  ultralytics.nn.modules.Conv                  [64, 64, 3, 2]
 17            [-1, 12]  1         0  ultralytics.nn.modules.Concat                [1]
 18                  -1  1    123648  ultralytics.nn.modules.C2f                   [192, 128, 1]
 19                  -1  1    147712  ultralytics.nn.modules.Conv                  [128, 128, 3, 2]
 20             [-1, 9]  1         0  ultralytics.nn.modules.Concat                [1]
 21                  -1  1    493056  ultralytics.nn.modules.C2f                   [384, 256, 1]
 22        [15, 18, 21]  1  33348775  ultralytics.nn.modules.Detect                [983, [64, 128, 256]]
Model summary: 225 layers, 35608311 parameters, 35608295 gradients, 181.9 GFLOPs

Transferred 319/355 items from pretrained weights
optimizer: SGD(lr=0.01) with parameter groups 57 weight(decay=0.0), 64 weight(decay=0.0005), 63 bias
/usr/lib/python3.10/multiprocessing/popen_fork.py:66: RuntimeWarning: os.fork() was called. os.fork() is incompatible with multithr
  self.pid = os.fork()
train: Scanning /content/car_ragini-5/train/labels... 1581 images, 0 backgrounds, 0 corrupt: 100% 1581/1581 [00:01<00:00, 808.95it/
Signal received. 15 <frame at 0x7de65942f780, file '/usr/lib/python3.10/_weakrefset.py', line 19, code __init__>
train: New cache created: /content/car_ragini-5/train/labels.cache
albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01, blur_limit=(3, 7)), ToGray(p=0.01), CLAHE(p=0.01, clip_limit=(1
/usr/lib/python3.10/multiprocessing/popen_fork.py:66: RuntimeWarning: os.fork() was called. os.fork() is incompatible with multithr
  self.pid = os.fork()
val: Scanning /content/car_ragini-5/valid/labels... 446 images, 0 backgrounds, 0 corrupt: 100% 446/446 [00:00<00:00, 818.01it/s]
Signal received. 15 <frame at 0x7de655296f20, file '/usr/lib/python3.10/threading.py', line 1545, code _shutdown>
val: New cache created: /content/car_ragini-5/valid/labels.cache
Image sizes 640 train, 640 val
Using 2 dataloader workers
Logging results to runs/detect/train2
Starting training for 30 epochs...

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
       1/30        10G       1.14      6.676      1.101         22        640: 100% 99/99 [01:40<00:00,  1.02s/it]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95):   0% 0/14 [00:00<?, ?it/s]/usr/lib/python
  self.pid = os.fork()
```

TESTING ON A MP4 FILE

```
!python /content/Licence-Plate-Detection-using-YOLO-V8/ultralytics/yolo/v8/detect/predict.py model='/content/Licence-Plate-Detection-using-Y
```

```
2024-04-12 09:54:38.105023: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:9261] Unable to register cuDNN factory: Attem
2024-04-12 09:54:38.105085: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Attempt
2024-04-12 09:54:38.106756: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: Att
2024-04-12 09:54:39.436862: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
Ultralytics YOLOv8.0.3 🚀 Python-3.10.12 torch-2.2.1+cu121 CUDA:0 (Tesla T4, 15102MiB)
Fusing layers...
Model summary: 168 layers, 3005843 parameters, 0 gradients, 8.1 GFLOPs
video 1/1 (1/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 73.9ms
video 1/1 (2/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.8ms
video 1/1 (3/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 10.2ms
video 1/1 (4/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.8ms
video 1/1 (5/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 11.1ms
video 1/1 (6/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 3 LicensePlates, 11.1ms
video 1/1 (7/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 3 LicensePlates, 9.2ms
video 1/1 (8/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 9.5ms
video 1/1 (9/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 3 LicensePlates, 12.7ms
video 1/1 (10/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 8.5ms
video 1/1 (11/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 11.5ms
video 1/1 (12/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 10.6ms
video 1/1 (13/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 11.5ms
video 1/1 (14/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 9.3ms
video 1/1 (15/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.7ms
```

```
video 1/1 (16/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 8.6ms
video 1/1 (17/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 2 LicensePlates, 8.4ms
video 1/1 (18/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.1ms
video 1/1 (19/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.6ms
video 1/1 (20/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.6ms
video 1/1 (21/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.5ms
video 1/1 (22/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 12.4ms
video 1/1 (23/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.4ms
video 1/1 (24/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.4ms
video 1/1 (25/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.7ms
video 1/1 (26/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 14.4ms
video 1/1 (27/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 9.3ms
video 1/1 (28/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (29/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 9.4ms
video 1/1 (30/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (31/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (32/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 9.1ms
video 1/1 (33/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.6ms
video 1/1 (34/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.9ms
video 1/1 (35/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.8ms
video 1/1 (36/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.8ms
video 1/1 (37/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (38/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 13.1ms
video 1/1 (39/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 11.4ms
video 1/1 (40/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 9.6ms
video 1/1 (41/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 12.1ms
video 1/1 (42/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 13.8ms
video 1/1 (43/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (44/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 15.7ms
video 1/1 (45/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.7ms
video 1/1 (46/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.5ms
video 1/1 (47/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 9.6ms
video 1/1 (48/631) /content/Licence-Plate-Detection-using-YOLO-V8/demo.mp4: 416x640 1 LicensePlate, 8.3ms
```

IMAGE PRE-PROCESSING

```
import os
import cv2
from matplotlib import pyplot as plt

# Paths for validation data
valid_image_dir = '/content/car_ragini-5/test/images'
valid_label_dir = '/content/car_ragini-5/test/labels'

# New paths for preprocessed images
preprocessed_image_dir = '/content/License-Plate-Detector-2/valid/preprocessed_images'

# Create the directory for preprocessed images if it doesn't exist
os.makedirs(preprocessed_image_dir, exist_ok=True)

# List all image files in the validation image directory
image_files = [f for f in os.listdir(valid_image_dir) if f.endswith(('.jpg', '.jpeg', '.png'))]

# Loop through each image file
for image_file in image_files:
    # Load the image using OpenCV
    image_path = os.path.join(valid_image_dir, image_file)
    original_image = cv2.imread(image_path)

    # Resize the image to a suitable size for OCR (e.g., 800x600)
    resized_image = cv2.resize(original_image, (800, 600))

    # Convert the image to grayscale
    grayscale_image = cv2.cvtColor(resized_image, cv2.COLOR_BGR2GRAY)

    # Save the preprocessed image to the new directory
    preprocessed_image_path = os.path.join(preprocessed_image_dir, image_file)
    cv2.imwrite(preprocessed_image_path, grayscale_image)

    # Optional: Display the original and preprocessed images using matplotlib
    plt.subplot(1, 2, 1)
    plt.imshow(cv2.cvtColor(original_image, cv2.COLOR_BGR2RGB))
    plt.title('Original Image')

    plt.subplot(1, 2, 2)
    plt.imshow(grayscale_image, cmap='gray')
    plt.title('Grayscale Image')

    plt.show()
```

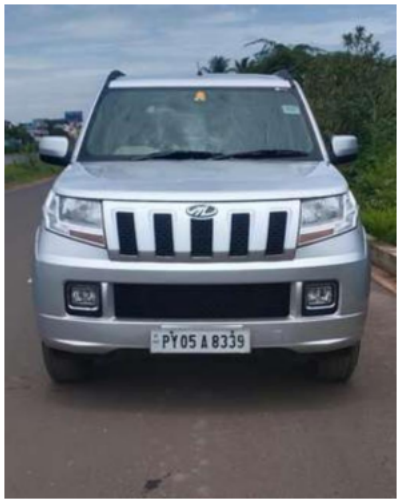
GAMMA CORRECTION

```
import cv2
import os
import matplotlib.pyplot as plt

def gamma_correction(image_dir, gamma=1.5):
    # Iterate over each image in the directory
    for filename in os.listdir(image_dir):
        if filename.endswith(".jpg") or filename.endswith(".png"):
            # Read the image
            image_path = os.path.join(image_dir, filename)
            image = cv2.imread(image_path)

            # Apply gamma correction
            gamma_corrected = cv2.pow(image / 255.0, gamma)
            gamma_corrected = (gamma_corrected * 255).astype('uint8')

            # Display the gamma-corrected image
            plt.imshow(cv2.cvtColor(gamma_corrected, cv2.COLOR_BGR2RGB))
            plt.axis('off')
            plt.title(f"Gamma Corrected Image - {filename}")
            plt.show()

# Define the directory containing the images
image_dir = "/content/car_ragini-5/test/images"

# Define the gamma value
gamma_value = 1.5  # Adjust as needed, typically between 0.1 and 3.0

# Apply gamma correction and display the images
gamma_correction(image_dir, gamma=gamma_value)
```

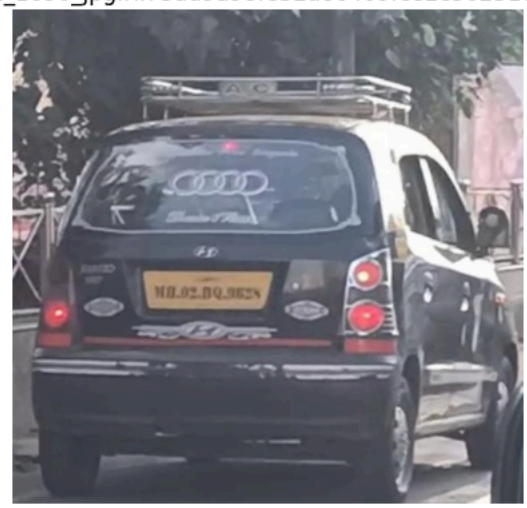
HIGHER RESOLUTION

```
from PIL import Image
import os
import matplotlib.pyplot as plt

# Directory containing the images
directory = '/content/car_ragini-5/test/images'

# Output directory for the higher resolution images
output_directory = '/content/car_ragini-5/test/higher_resolution'

# Create the output directory if it doesn't exist
os.makedirs(output_directory, exist_ok=True)

# Function to upscale images
def upscale_image(input_path, output_path, scale_factor):
    # Open image
    image = Image.open(input_path)
    # Get original size
    original_size = image.size
    # Calculate new size
    new_size = tuple(int(dim * scale_factor) for dim in original_size)
    # Resize image
    resized_image = image.resize(new_size, Image.LANCZOS)  # Using Lanczos resampling for high-quality results
    # Save resized image
    resized_image.save(output_path)
    return resized_image

# Scaling factor for increasing resolution
scaling_factor = 2  # You can adjust this according to your requirement

# Process each image in the directory
for filename in os.listdir(directory):
    if filename.endswith('.jpg') or filename.endswith('.png'):  # Assuming images are in JPG or PNG format
        input_path = os.path.join(directory, filename)
        output_path = os.path.join(output_directory, filename)
        resized_image = upscale_image(input_path, output_path, scaling_factor)

        # Display the image
        plt.imshow(resized_image)
        plt.title(filename)
        plt.axis('off')  # Hide axis
        plt.show()
```

PY15_jpg.rf.4c3e52012bbe149520dc8ef77d743d72.jpg



video11_1690_jpg.rf.73ad9a98fe32a86409fce2c30251e9d0.jpg

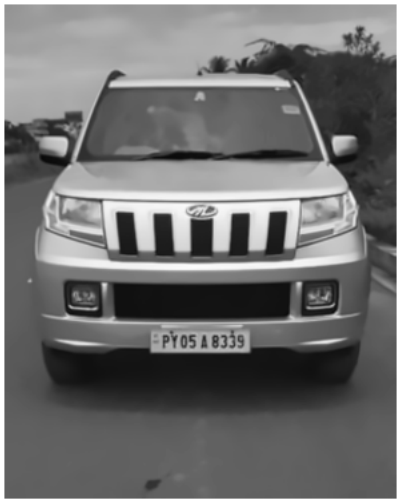


JK9_jpg.rf.5d4942312a7b0bfc70b8a58db9571857.jpg

NOISE REDUCTION

```
import os
import cv2
import matplotlib.pyplot as plt

# Directory containing the images
directory = '/content/car_ragini-5/test/images'

# Output directory for the denoised images
output_directory = '/content/car_ragini-5/test/denoised_images'

# Create the output directory if it doesn't exist
os.makedirs(output_directory, exist_ok=True)

# Function to denoise images
def denoise_image(input_path, output_path):
    # Read image
    image = cv2.imread(input_path)
    # Convert to grayscale if needed
    if len(image.shape) > 2 and image.shape[2] > 1:
        image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    # Perform denoising
    denoised_image = cv2.fastNlMeansDenoising(image, None, h=10, searchWindowSize=21, templateWindowSize=7)
    # Save denoised image
    cv2.imwrite(output_path, denoised_image)
    return denoised_image

# Process each image in the directory
for filename in os.listdir(directory):
    if filename.endswith('.jpg') or filename.endswith('.png'):  # Assuming images are in JPG or PNG format
        input_path = os.path.join(directory, filename)
        output_path = os.path.join(output_directory, filename)
        denoised_image = denoise_image(input_path, output_path)

        # Display the image
        plt.imshow(denoised_image, cmap='gray')  # Display grayscale image
        plt.title(filename)
        plt.axis('off')  # Hide axis
        plt.show()
```

PY15_jpg.rf.4c3e52012bbe149520dc8ef77d743d72.jpg



video11_1690_jpg.rf.73ad9a98fe32a86409fce2c30251e9d0.jpg

JK9_jpg.rf.5d4942312a7b0bfc70b8a58db9571857.jpg

BOUNDING BOX CALCULATION

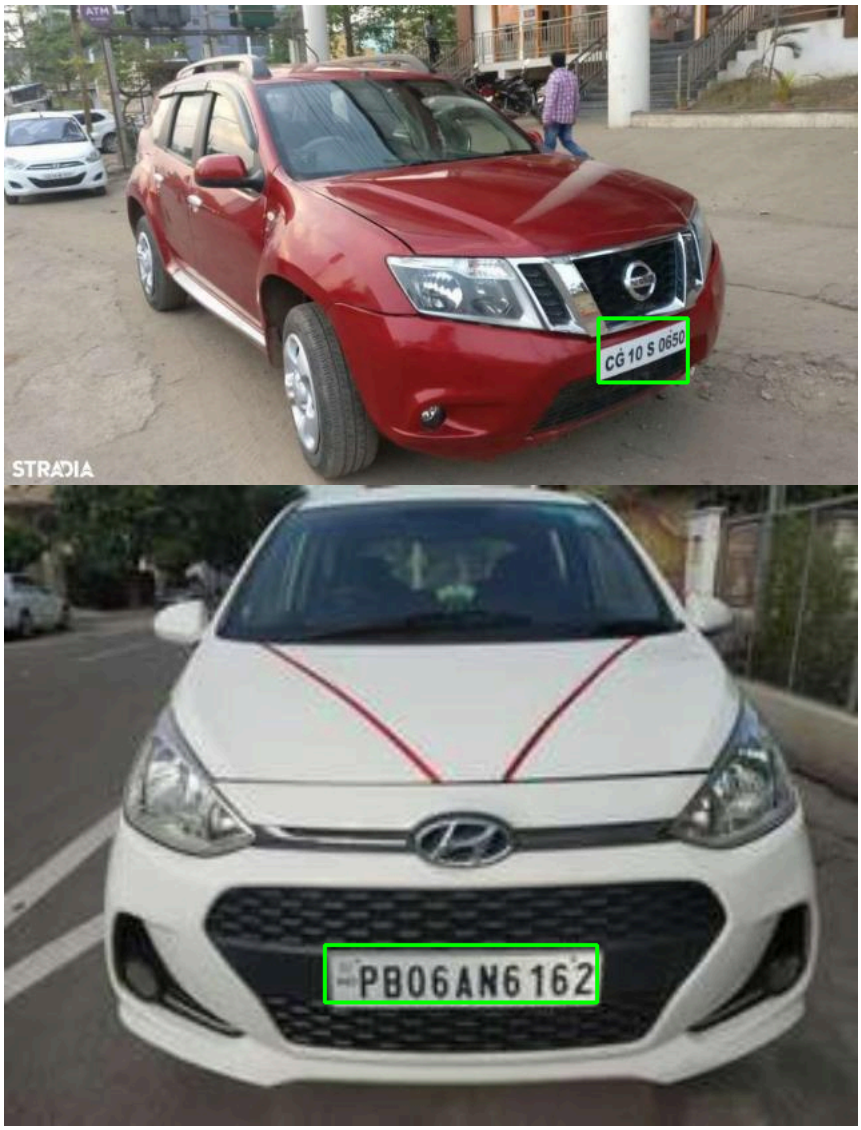
```
import os
import cv2

label_dir = '/content/car_ragini-5/test/labels'
image_dir = '/content/car_ragini-5/test/images'

# List all label files in the directory
label_files = [f for f in os.listdir(label_dir) if f.endswith('.txt')]

for label_file in label_files:
    # Load the content of the label file
    with open(os.path.join(label_dir, label_file), 'r') as f:
        lines = f.readlines()

    # Get the corresponding image file name
    image_file = os.path.splitext(label_file)[0] + '.jpg'

    # Load the image using OpenCV to get dimensions
    image_path = os.path.join(image_dir, image_file)
    example_image = cv2.imread(image_path)

    # Get the dimensions
    image_height, image_width, _ = example_image.shape

    for line in lines:
        # Parse the values from the line
        values = line.strip().split()
        class_index = int(values[0])
        center_x, center_y, width, height = map(float, values[1:])

        # Calculate bounding box coordinates
        x_min = int((center_x - (width / 2)) * image_width)
        y_min = int((center_y - (height / 2)) * image_height)
        x_max = int((center_x + (width / 2)) * image_width)
        y_max = int((center_y + (height / 2)) * image_height)

        # Display or use the bounding box coordinates as needed
        print(f"Bounding box for {image_file}: ({x_min}, {y_min}, {x_max}, {y_max})")
```

```
Bounding box for KA10_jpg.rf.1452a9190233f6537a4de4c77744b33f.jpg: (228, 386, 402, 430)
Bounding box for AP3_jpg.rf.5f0edf00536fbeb353046ee1cdb16124.jpg: (307, 480, 437, 562)
Bounding box for PY5_jpg.rf.d30b987523da40aa5c8f0a476efa0b07.jpg: (108, 360, 230, 385)
Bounding box for HP8_jpg.rf.86e42313f3e0f7177cd6260bc50df942.jpg: (181, 291, 312, 329)
Bounding box for video11_4070_jpg.rf.59a61d149903327bf9007bf2410373b7.jpg: (327, 401, 504, 452)
Bounding box for video5_90_jpg.rf.44043dd473c0893f4bb0bb289eedda0d.jpg: (83, 225, 297, 281)
Bounding box for 581e2224-3640-4bad-9d90-c2076a9f64f4___617609-jpg_jpeg.rf.2963836ce91252fa126bcb668f3e8368.jpg: (240, 227, 402, 25
Bounding box for 28574c06-ac11-422e-864f-a51b726bb9ba___3e7fd381-0ae5-4421-8a70-279ee0ec1c61_hqdefault0_jpg.rf.1916ad26c2f4500959aa
Bounding box for video6_1030_jpg.rf.ecb2625b936e2be4b1f88546e78e8ca1.jpg: (33, 61, 264, 126)
Bounding box for video10_760_jpg.rf.df02dfaf936089c7d582b8bac7e6e7cc.jpg: (458, 318, 605, 357)
Bounding box for KA5_jpg.rf.27c990d6af3b70e95fdb6710e9061fc9.jpg: (252, 304, 395, 336)
Bounding box for UK10_jpg.rf.95a8a2333c6628d001a83bff293204df.jpg: (146, 474, 317, 510)
Bounding box for AR11_jpg.rf.265bd38fd395e8014aa109c9820f34bb.jpg: (27, 444, 231, 478)
Bounding box for video11_4780_jpg.rf.9902dd0e8621a98f38ad25e3b3672951.jpg: (167, 394, 322, 436)
Bounding box for video11_1040_jpg.rf.1461eb41b3e90dc5f3f65eef6266946c.jpg: (148, 321, 345, 376)
Bounding box for video8_1430_jpg.rf.d1f4861baff700b0ef271977170ae4b7.jpg: (226, 175, 323, 200)
Bounding box for NL9_jpg.rf.d8c7ab15e1c00e952a9a07cfd449fc53.jpg: (76, 466, 185, 497)
Bounding box for video5_400_jpg.rf.3a2c28b63cc7ab0e061109c615227be4.jpg: (63, 336, 446, 451)
Bounding box for video11_4430_jpg.rf.486aa9ea7fe8226d8fca30c5bf0c2369.jpg: (152, 435, 297, 477)
Bounding box for TN1_jpg.rf.ed1ae3943659094fa9b69d1bb5cbcf90.jpg: (187, 390, 283, 418)
Bounding box for video8_880_jpg.rf.552172acfc5c91278d6a1062fdec87b4.jpg: (94, 295, 219, 341)
Bounding box for HP18_jpg.rf.681e157264ebd3591d3d89ac4acb6986.jpg: (245, 497, 320, 514)
Bounding box for 07bd977e-d578-49a2-b345-7cee5a4db6bf___new_1031520d1356604430-skoda-rapid-joins-family-edit-sold-wp_000281-jpg_jpeg
Bounding box for UP24_jpg.rf.0839740b94f2f11e21847862c36cceb9.jpg: (132, 446, 281, 479)
Bounding box for AP25_jpg.rf.c0b8ce1cc80ba78be9cdb88d226e497d.jpg: (157, 439, 303, 468)
Bounding box for AR2_jpg.rf.2b877a0ff78d441ab19628993a1445e7.jpg: (266, 379, 409, 411)
Bounding box for video11_1020_jpg.rf.20239f410050cf5d7ffb4750a10d890e.jpg: (155, 290, 351, 343)
Bounding box for PB21_jpg.rf.d25ea683eeedfe547c71c7e9c5e4c1b2.jpg: (78, 399, 183, 434)
Bounding box for JK3_jpg.rf.f201ddb3a7bfdba499f36d20afa6f9e8.jpg: (242, 395, 399, 432)
Bounding box for video8_930_jpg.rf.018921e19b3a683a6198508710acdadc.jpg: (104, 480, 204, 514)
Bounding box for PY18_jpg.rf.f67ca685c73c15f97ab3dd4fac8208a9.jpg: (168, 381, 282, 410)
Bounding box for car-wbs-TN37CR4019_00000_jpeg.rf.3cce7517f7eb0dc81e59b92d6ef81b19.jpg: (117, 315, 344, 422)
Bounding box for AR10_jpg.rf.5f6789d64e0292f4b5c7ff05e89c3ae8.jpg: (58, 300, 153, 329)
Bounding box for HP15_jpg.rf.9d8d37fc1bc1406ec98dec58fcf02f7d.jpg: (259, 364, 396, 395)
Bounding box for video8_1310_jpg.rf.b1a37fa9ba347bd26c8ade5922125126.jpg: (50, 228, 117, 269)
Bounding box for video2_220_jpg.rf.a315dcd342ec1d90e69710a1a5532efa.jpg: (164, 176, 302, 219)
Bounding box for video3_2180_jpg.rf.98d1d7c33c2250c2a89b4eefa56dc537.jpg: (176, 525, 316, 573)
Bounding box for video11_780_jpg.rf.13d5cdabac15fec01bd1893e554b3af4.jpg: (88, 192, 382, 269)
Bounding box for WB23_jpg.rf.a7eb2acf9b20ae49a86191f0961ac177.jpg: (217, 333, 420, 376)
Bounding box for NL3_jpg.rf.d54b5db1a9f51a6ccc9dcf441247f85f.jpg: (275, 336, 460, 401)
Bounding box for video4_2800_jpg.rf.444f01aeaf4c7dfd8763063871f17a4f.jpg: (48, 139, 135, 173)
```

```
Bounding box for e663fa35-ce3c-401d-8451-30edd236b3e4___maxresdefault2-jpg_jpeg.rf.2c9a0d13f725d1f566af4ddbd38ec46a.jpg: (186, 132,
Bounding box for HR5_jpg.rf.620c3f411c5a8603b371635ce0c6d313.jpg: (216, 327, 385, 364)
Bounding box for PB22_jpg.rf.4ae09f6fd6b8741af10b51c74db3b2b3.jpg: (240, 344, 444, 387)
Bounding box for PY7_jpg.rf.2d8e1dfca8ca2907e64d22afbcefa837.jpg: (201, 547, 328, 580)
Bounding box for AS9_jpg.rf.e010f439bb56561e8a9f8c525be854e0.jpg: (233, 315, 402, 352)
Bounding box for video3_620_jpg.rf.ace3b6d823da077b24a082ce0ac15f54.jpg: (40, 282, 143, 339)
Bounding box for DL5_jpg.rf.fc69a30ceb1df16084ce1ed67253dc89.jpg: (139, 489, 318, 527)
Bounding box for GJ2_jpg.rf.ed54efe899274f598e2a82d4e977ed7a.jpg: (116, 243, 231, 276)
Bounding box for c2feb2b7-fbb3-4e1e-ad48-cc8112a1ab3f___Maruti_R3_On_Test-jpg_jpeg.rf.6b4e37a67781508f186921923302c1fb.jpg: (206, 2
Bounding box for 72894c2b-5999-4d87-baa4-e3507548e011___3e7fd381-0ae5-4421-8a70-279ee0ec1c61_847602356_1_1080x720_nissan-terrano-xl
Bounding box for car-wbs-KL55R2473_00000_jpeg.rf.38cf93cd04a2a4b52876b16b67bbbde3.jpg: (162, 186, 395, 243)
Bounding box for WB4_jpg.rf.b66f1d981d2c5d100d7f51659bbd4605.jpg: (209, 471, 335, 513)
Bounding box for 8187c22d-5fa4-4976-9c00-80b2ab66b97d___1290890d1411349145-take-look-number-plate-img_20140903_093600_hdr-jpg_jpeg.
Bounding box for WB15_jpg.rf.5fdfd9459644290ab45a9de1fc72d806.jpg: (164, 432, 319, 479)
Bounding box for car-wbs-MH02BM5048_00000_jpeg.rf.94b29aafcfe1c0fd844d7200dc4bdc2d.jpg: (215, 79, 422, 132)
```

CV2 MODULE FOR CHARACTER RECOGNITION

```
import os
import cv2
from google.colab.patches import cv2_imshow

label_dir = '/content/car_ragini-5/test/labels'
image_dir = '/content/car_ragini-5/test/images'

# List all label files in the directory
label_files = [f for f in os.listdir(label_dir) if f.endswith('.txt')]

# Process all images
for label_file in label_files:
    # Load the content of the label file
    with open(os.path.join(label_dir, label_file), 'r') as f:
        lines = f.readlines()

    # Get the corresponding image file name
    image_file = os.path.splitext(label_file)[0] + '.jpg'

    # Load the image using OpenCV
    image_path = os.path.join(image_dir, image_file)
    example_image = cv2.imread(image_path)

    # Get the dimensions
    image_height, image_width, _ = example_image.shape

    for line in lines:
        # Parse the values from the line
        values = list(map(float, line.strip().split()))
        class_index = int(values[0])

        # Calculate bounding box coordinates
        center_x, center_y, width, height = values[1:]
        x_min = int((center_x - width / 2) * image_width)
        y_min = int((center_y - height / 2) * image_height)
        x_max = int((center_x + width / 2) * image_width)
        y_max = int((center_y + height / 2) * image_height)

        # Draw bounding box on the image
        cv2.rectangle(example_image, (x_min, y_min), (x_max, y_max), (0, 255, 0), 2)

    # Display the image with bounding boxes in Colab
    cv2_imshow(example_image)
```



EASY OCR IMPLEMENTATION

```
!git clone https://github.com/Arijit1080/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR.git
```

```
Cloning into 'Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR'...
remote: Enumerating objects: 135, done.
remote: Counting objects: 100% (41/41), done.
remote: Compressing objects: 100% (35/35), done.
remote: Total 135 (delta 7), reused 40 (delta 6), pack-reused 94
Receiving objects: 100% (135/135), 14.74 MiB | 24.62 MiB/s, done.
Resolving deltas: 100% (34/34), done.
```

```
cd /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR
```

```
/content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR
```

INSTALLING REQUIREMENTS

```
pip install -r /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/requirements.txt
```

```
Requirement already satisfied: ultralytics==8.0.3 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: hydra-core>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: matplotlib>=3.2.2 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-a
Requirement already satisfied: opencv-python>=4.1.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Dete
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-a
```

```
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-a
Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detectio
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-an
Requirement already satisfied: torch>=1.7.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-an
Requirement already satisfied: torchvision>=0.8.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-an
Collecting Easyocr (from -r /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/requirements.txt (line 16))
  Downloading easyocr-1.7.1-py3-none-any.whl (2.9 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 2.9/2.9 MB 14.2 MB/s eta 0:00:00
Requirement already satisfied: tensorboard>=2.4.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detect
Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-a
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection
Requirement already satisfied: ipython in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-and-Rec
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-and-Recog
Requirement already satisfied: thop>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detection-and
Requirement already satisfied: GitPython>=3.1.24 in /usr/local/lib/python3.10/dist-packages (from -r /content/Licence-Plate-Detecti
Requirement already satisfied: omegaconf<2.4,>=2.2 in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r /content/
Requirement already satisfied: antlr4-python3-runtime==4.9.* in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from hydra-core>=1.2.0->-r /content/Licence-Pl
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Lic
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Licence
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Li
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Li
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content/Lic
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.2.2->-r /content
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /cont
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Licence-
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Li
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->-r /content/Li
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Det
Requirement already satisfied: typing-extensions>=4.8.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Detect
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Det
Requirement already satisfied: jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Dete
Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plate-Dete
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cudnn-cu12==8.9.2.26 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /conte
Requirement already satisfied: nvidia-cublas-cu12==12.1.3.1 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /cont
Requirement already satisfied: nvidia-cufft-cu12==11.0.2.54 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /cont
Requirement already satisfied: nvidia-curand-cu12==10.3.2.106 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /co
Requirement already satisfied: nvidia-cusolver-cu12==11.4.5.107 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-cusparse-cu12==12.1.0.106 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /
Requirement already satisfied: nvidia-nccl-cu12==2.19.3 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/
Requirement already satisfied: nvidia-nvtx-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /conten
Requirement already satisfied: triton==2.2.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.7.0->-r /content/Licence-Plat
Requirement already satisfied: nvidia-nvjitlink-cu12 in /usr/local/lib/python3.10/dist-packages (from nvidia-cusolver-cu12==11.4.5.
Requirement already satisfied: opencv-python-headless in /usr/local/lib/python3.10/dist-packages (from Easyocr->-r /content/Licence
Requirement already satisfied: scikit-image in /usr/local/lib/python3.10/dist-packages (from Easyocr->-r /content/Licence-Plate-Det
```

EASY OCR ON MP4 FILE

```
!python predictWithOCR.py model='/content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/best.pt' source='/content/Licence-Pl

Downloading detection model, please wait. This may take several minutes depending upon your network connection.
Progress: |████████████████████████████████████████| 100.0% CompleteDownloading recognition model, please wait. This may t
Progress: |████████████████████████████████████████| 100.0% Complete2024-04-11 11:31:08.860019: E external/local_xla/xla/
2024-04-11 11:31:08.860073: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Attempt
2024-04-11 11:31:08.861391: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: Att
2024-04-11 11:31:10.058795: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
Ultralytics YOLOv8.0.3 🚀 Python-3.10.12 torch-2.2.1+cu121 CUDA:0 (Tesla T4, 15102MiB)
Fusing layers...
Model summary: 168 layers, 3005843 parameters, 0 gradients, 8.1 GFLOPs
WARNING ⚠️ NMS time limit 0.550s exceeded
video 1/1 (1/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 67.1ms
video 1/1 (2/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 6.5ms
video 1/1 (3/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 6.7ms
video 1/1 (4/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 6.3ms
video 1/1 (5/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.0ms
video 1/1 (6/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 3 LicensePlates, 6.8ms
video 1/1 (7/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 3 LicensePlates, 6.8ms
video 1/1 (8/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 6.8ms
video 1/1 (9/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 3 LicensePlates, 7.4ms
video 1/1 (10/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 7.1ms
video 1/1 (11/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 8.8ms
video 1/1 (12/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 7.3ms
video 1/1 (13/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 8.1ms
video 1/1 (14/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 7.0ms
```

```
video 1/1 (15/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.3ms
video 1/1 (16/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 7.1ms
video 1/1 (17/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 2 LicensePlates, 7.6ms
video 1/1 (18/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.1ms
video 1/1 (19/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.9ms
video 1/1 (20/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.5ms
video 1/1 (21/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.7ms
video 1/1 (22/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.2ms
video 1/1 (23/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.5ms
video 1/1 (24/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 10.8ms
video 1/1 (25/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.2ms
video 1/1 (26/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 9.3ms
video 1/1 (27/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.7ms
video 1/1 (28/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.1ms
video 1/1 (29/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.1ms
video 1/1 (30/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.2ms
video 1/1 (31/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.4ms
video 1/1 (32/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.5ms
video 1/1 (33/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.7ms
video 1/1 (34/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.2ms
video 1/1 (35/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 10.1ms
video 1/1 (36/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.0ms
video 1/1 (37/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.1ms
video 1/1 (38/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 9.2ms
video 1/1 (39/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.7ms
video 1/1 (40/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 10.3ms
video 1/1 (41/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.5ms
video 1/1 (42/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.9ms
video 1/1 (43/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 8.3ms
video 1/1 (44/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.6ms
video 1/1 (45/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.5ms
video 1/1 (46/631) /content/Licence-Plate-Detection-and-Recognition-using-YOLO-V8-EasyOCR/demo.mp4: 416x640 1 LicensePlate, 7.1ms
```

PRINTING LICENSE PLATE CHARACTERS