**Yolo v5 Object Detection Algorithm for Custom Object Detection**

## Setting Up YOLO

## Clone the [**YOLOv5 GitHub**](https://github.com/ultralytics/yolov5) repository (maintained by **Ultralytics).**

|  |
| --- |
| $ git clone <https://github.com/ultralytics/yolov5>  $ cd yolov5 |

Directory Structure:

yolov5/

.github/

data/

models/

utils/

.dockerignore

.gitattributes

.gitignore

.pre-commit-config.yaml

CONTRIBUTING.md

detect.py

Dockerfile

export.py

hubconf.py

LICENSE

README.md

requirements.txt

setup.cfg

train.py

tutorial.ipynb

val.py

## Install necessary libraries:

## We will install all the necessary libraries as follows:

|  |
| --- |
| $ pip install -r requirements.txt |

## Prepare Dataset

## Download a complete labeled dataset from this [Link](https://drive.google.com/file/d/1gQD1OovQDyjMlUEWl6IEn2mzgS6KNppX/view).

## Then extract the zip file and move it to yolov5/ directory.

## 1144images\_dataset/

## train/

## test/

1. Create a file named as data.yaml inside your yolov5/ directory and paste the below code into it. This file will contain your labels and the path of the training and testing datasets.

|  |
| --- |
| train: 1144images\_dataset/train  val: 1144images\_dataset/test  nc: 77  names: ['200m',  '50-100m',  'Ahead-Left',  'Ahead-Right',  'Axle-load-limit',  'Barrier Ahead',  'Bullock Cart Prohibited',  'Cart Prohobited',  'Cattle',  'Compulsory Ahead',  'Compulsory Keep Left',  'Compulsory Left Turn',  'Compulsory Right Turn',  'Cross Road',  'Cycle Crossing',  'Compulsory Cycle Track',  'Cycle Prohibited',  'Dangerous Dip',  'Falling Rocks',  'Ferry',  'Gap in median',  'Give way',  'Hand cart prohibited',  'Height limit',  'Horn prohibited',  'Humpy Road',  'Left hair pin bend',  'Left hand curve',  'Left Reverse Bend',  'Left turn prohibited',  'Length limit',  'Load limit 5T',  'Loose Gravel',  'Major road ahead',  'Men at work',  'Motor vehicles prohibited',  'Nrrow bridge',  'Narrow road ahead',  'Straight prohibited',  'No parking',  'No stoping',  'One way sign',  'Overtaking prohibited',  'Pedestrian crossing',  'Pedestrian prohibited',  'Restriction ends sign',  'Right hair pin bend',  'Right hand curve',  'Right Reverse Bend',  'Right turn prohibited',  'Road wideness ahead',  'Roundabout',  'School ahead',  'Side road left',  'Side road right',  'Slippery road',  'Compulsory sound horn',  'Speed limit',  'Staggred intersection',  'Steep ascent',  'Steep descent',  'Stop',  'Tonga prohibited',  'Truck prohibited',  'Compulsory turn left ahead',  'Compulsory right turn ahead',  'T-intersection',  'U-turn prohibited',  'Vehicle prohibited in both directions',  'Width limit',  'Y-intersection',  'Sign\_C',  'Sign\_T',  'Sign\_S',  'No entry',  'Compulsory Keep Right',  'Parking',  ] |

We will use a total of 77 different classes

## Training YOLO v5 model

We will use the YOLOv5s version here.

|  |
| --- |
| $ python train.py --data data.yaml --cfg yolov5s.yaml --batch-size 8 --name Model |

The final trained model is in Inside runs/train/Model/ folder.

|  |
| --- |
| runs/train/Model/  weights/  best.pt  last.pt  227359 events.out.tfevents.1638984167.LAPTOP-7CJ5UG09.6292.0  hyp.yaml  opt.yaml  results.txt  results.png  train\_batch0.jpg  train\_batch1.jpg  train\_batch2.jpg |

## best.pt contains your final model for final Detection & Classification.

## results.txt file will contain your summary of Accuracy & Losses achieved at each epoch.

## Other images contain some plots and diagrams that will be useful for more analysis.

## Test Yolo v5 Model

## Now copy the model that we have trained above and paste it into the weights directory.

## Move inside that directory where your codes are present.

1. For testing Images

|  |
| --- |
| $ python detect.py --source ../Test/test1.jpeg --weights ../Model/weights/best.pt |

1. For testing Videos

|  |
| --- |
| $ python detect.py --source ../Test/vidd1.mp4 --weights ../Model/weights/best.pt |

1. For Webcam

|  |
| --- |
| $ python detect.py --source 0 --weights ../Model/weights/best.pt |

Your final images and videos are stored in Results/ directory.