

Akshay Dhame  
Project: Traffic-Sign-Detection

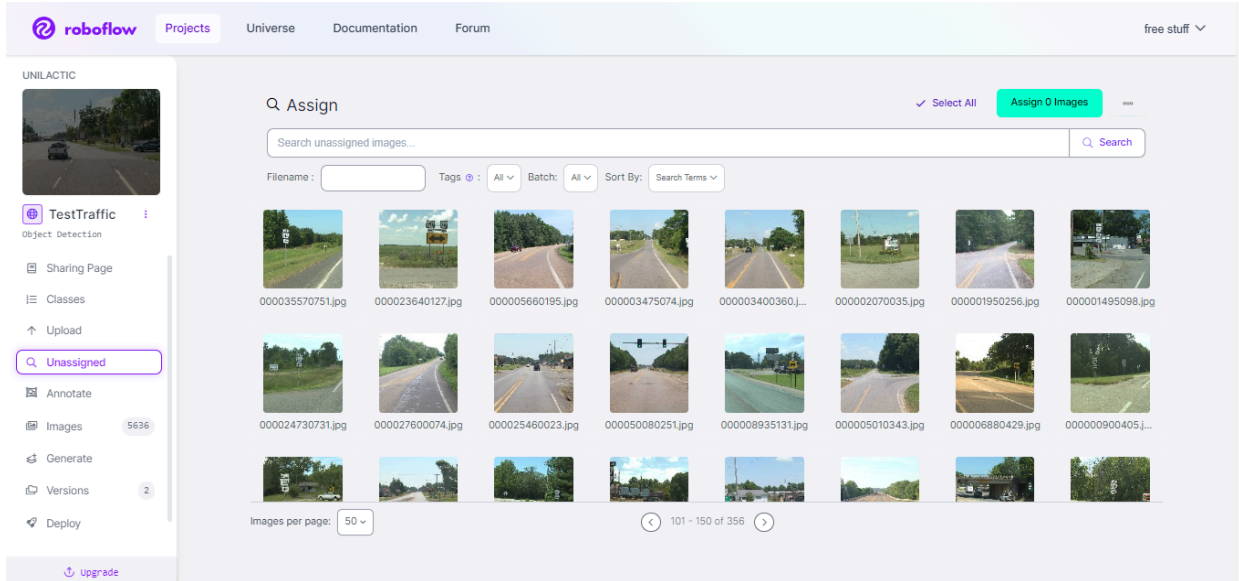
Flow:

1. Model Selection for detection: YOLOv8
2. Data preparation: YOLO format dataset
3. Installing YOLO dependencies
4. Training
5. Validating
6. Predicting
7. Repeat from 4. If required

## 1. Exploratory data analysis on the data

- Classes: 3
- Total images: 6000 (2000 for each class)
- Modified ImagePath, x0, x1, y0, y1 to ImagePath x0, y0, x1, y1 in csv for correct annotations
- Converted CSV dataset to YOLO format: classNumber centerX, centerY, Width, Height in separate txt file for each image with data.yaml using Roboflow
- Unannotated image: 356 (majorly DIRECTIONAL ARROW AUXILIARY)
- Splitted dataset into train, test and valid dataset in a ratio of 7:2:1
- Applied Preprocessing to Auto-Orient
- No Augmentations applied
- Exported with code

The screenshot shows the Roboflow web interface for a project named 'TestTraffic'. The interface is divided into a sidebar on the left and a main content area on the right. The sidebar contains navigation links: 'TestTraffic', 'Object Detection', 'Sharing Page', 'Classes', 'Upload', 'Unassigned', 'Annotate', 'Images' (with a count of 5636), 'Generate', 'Versions' (highlighted with a red box and a count of 2), and 'Deploy'. The main content area displays the dataset 'TestTraffic' with a 'View on Universe' button. Below this, there are two 'VERSIONS' listed: '2024-01-12 4:38pm v2 Jan 12, 2024' and '2024-01-12 2:41pm v1 Jan 12, 2024'. The main area also shows the total number of images (5636) and a 'View All Images' link. Below this, the 'Dataset Split' is shown: 'TRAIN SET' (3955 Images, 70%), 'VALID SET' (1126 Images, 20%), and 'TEST SET' (555 Images, 10%). The 'Preprocessing' section indicates 'Auto-Orient: Applied', and the 'Augmentations' section indicates 'No augmentations were applied.'.

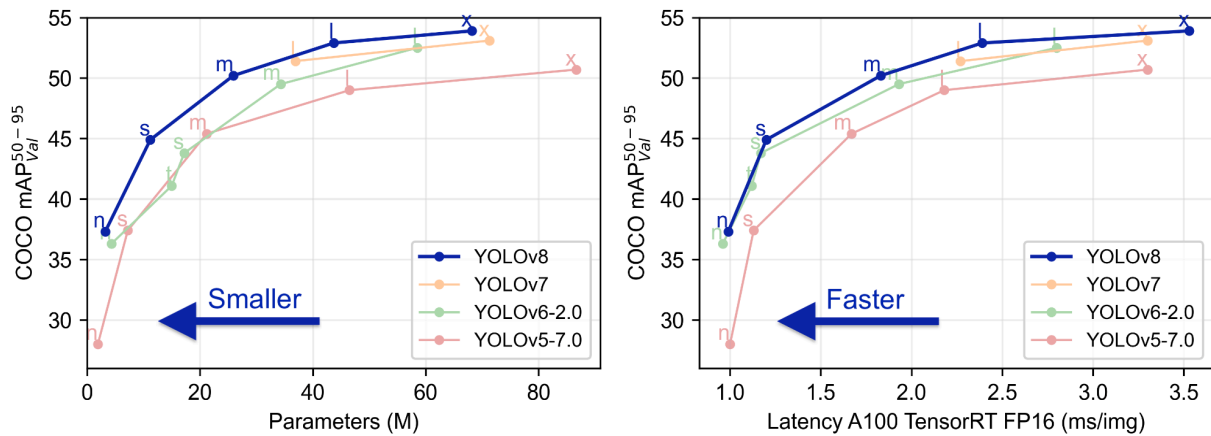


## 2. Number of training epochs and other parameters set for training

Ans:

Used YOLOv8m model for combination of accuracy, FPS & simplicity

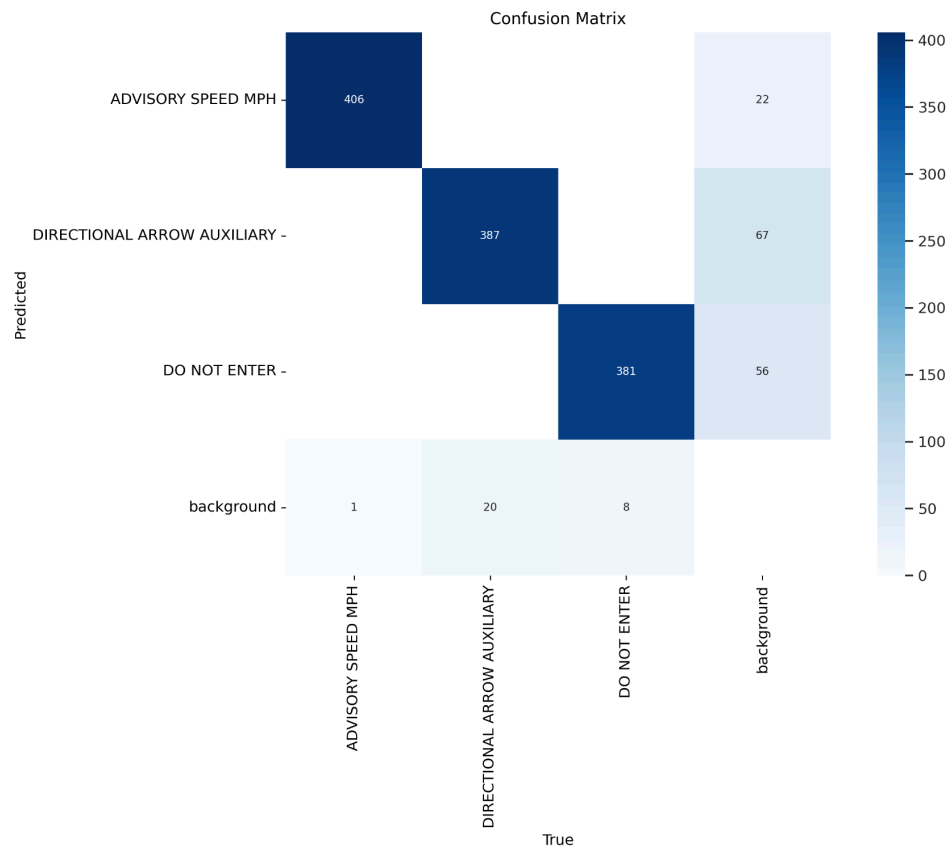
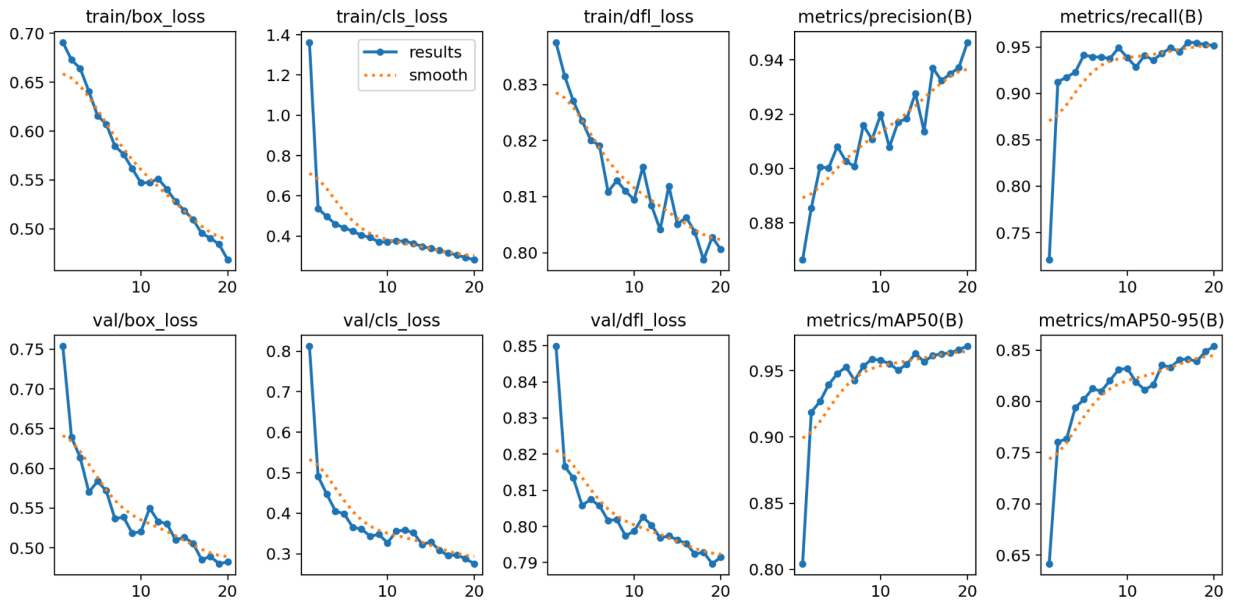
epochs=20, imgsz=720 Training time 1 hour+ with 3.3 minutes per epoch



### 3. A note on the Training results regarding the performance and graphs.

Loss reduces with epochs in decreasing logarithmic curve

And Accuracy increased with epochs in increasing logarithmic curve



#### 4. A note on the detection results obtained on the unseen data

Ans: with the resolution of 640, the model was not that accurate as training and testing resolution were very different but with resolution of 720, results were impressive. For higher resolutions Google colab GPU was going out of memory.

Though output contains some false detections but confidence scores for that are too low so can be ignored.

Improvements: All images annotation, Higher resolution, extra large yolo model, increased number of epochs



#### 5. A note on the object tracking results

Ans: Tracking results were not good for original low FPS video and tracking needs at least 1-2 frames to track. After trimming the video from 2 minutes(232 frames) to 12 seconds(353 frames), results improved.

Videos attached