**DATASET LABELING**
- Label Conversion/Correction Step     **DONE**
- Class Correction Step     **DONE**

**DATASET ANALYSIS (python script)**
- Python script to return an overview of the classes in the dataset.   **DONE**
- Sample output of the script

| Class | Total Instances | Number of images | List of Images |
|---|---|---|---|
| face | XXX | XXX | XXX |
| mask-1 | XXX | XXX | XXX |
| mask-2 | XXX | XXX | XXX |
| mask-3 | XXX | XXX | XXX |
| eyewear | XXX | XXX | XXX |
| person | XXX | XXX | XXX |
| helmet | XXX | XXX | XXX |

- Python script to return 'k' core analysis of the dataset.   **DONE**
  - Here k is the threshold (minimum number of occurence of a class) in an image
  - For bias reduction

| Class | Minimum 'k' Instances | Number of images | List of Images |
|---|---|---|---|
| face | k | XXX | XXX |
| mask-1 | k | XXX | XXX |
| mask-2 | k | XXX | XXX |
| mask-3 | k | XXX | XXX |
| eyewear | k | XXX | XXX |
| person | k | XXX | XXX |
| helmet | k | XXX | XXX |

**DATA AUGMENTATION**   **PENDING**
- Diagnosing bias in a dataset https://dspace.mit.edu/handle/1721.1/108212
- https://blog.roboflow.com/yolov4-data-augmentation/
- https://github.com/srp-31/Data-Augmentation-for-Object-Detection-YOLO-
- https://albumentations.ai/docs/getting_started/bounding_boxes_augmentation/
-

## HYPER-PARAMETER EVOLUTION  DONE
- https://github.com/ultralytics/yolov5/issues/607
- 

## YOLOv5 CUSTOM TRAINING  DONE
- https://github.com/ultralytics/yolov5/wiki/Train-Custom-Data
- 

## MODEL CONVERSION  DONE

### PYTORCH MODEL TO ONNX

### ONNX TO TENSORFLOW FREEZE GRAPH

### TENSORFLOW FREEZE GRAPH TO TFlite

| pytorch (.pt) ----->>>> onnx(.onnx) | https://github.com/ultralytics/yolov5/issues/251 | Follow the repo | use export.py | in yolov5 |
|---|---|---|---|---|
| onnx(.onnx) ----->>>> TensorFlow FreezeGraph (.pb) | **pip install git+https://github.com/onnx/onnx-tensorflow.git** | Tensorflow 2 | pip install tensorflow-addons | onnx-tf convert -i "best_yolov5s_exp12_e.onnx" -o "best_yolov5s_exp12_e.pb" |
| TensorFlow FreezeGraph (.pb) ------>>>>>> TFLITE (.tflite) | python convet_to_tflite.py | https://stackoverflow.com/questions/53182177/how-do-you-convert-a-onnx-to-tflite | | |

## BENCHMARKING  DONE

| BENCHMARKING | |
|---|---|
| https://www.tensorflow.org/lite/performance/measurement | |
| ./benchmark_model --graph=best_yolov5s_exp12_e.tflite --num_threads=4 --enable_op_profiling=true | |
| https://github.com/tensorflow/tensorflow/tree/master/tensorflow/lite/tools/benchmark#profiling-model-operators | |

**TFlite INFERENCE SCRIPT (python based (not for embedded systems))** <span style="color:green">**DONE**</span>

**Optimisation of script (talk to abhishek)**

**TFlite INFERENCE SCRIPT (python based (for embedded systems))** <span style="color:orange">**PENDING**</span>

| TFLITE INFERENCE SCRIPT | |
|---|---|
| https://www.tensorflow.org/lite/guide/python | |
| https://github.com/tensorflow/tensorflow/blob/master/tensorflow/lite/examples/python/label_image.py | |