**Program Usage**

**Training:**

* Images have been separated in to training and validation set (85%:15% ratio) and placed inside the ‘dataset/’ folder under sub-directories ‘train/’ and ‘val/’ respectively.
* Make sure all packages (of given version or higher) in requirements.txt are installed in order to be able to run the program.
* To preform training on the given dataset over pre-trained model trained on coco dataset, run the following command:

cd samples/buildings/

python3 building.py train --dataset=../../dataset/ --weights=coco

* Pre-trained coco weights will be automatically downloaded the first time training is run.
* Trained weights are saved inside ‘logs/building…./’ folder along with tf event files that can be used to view the loss and other graphs on tensorboard. Weights are saved in .h5 format.
* Command to start tensorboard(assuming tensorboard is installed properly):

tensorboard --logdir=logs/building……./

**Inference:**

* To run inference on images, place the images (in .jpg or .png format) to run inside sample/buildings/images/ and run the following command:

cd samples/buildings/

python3 building.py run\_image --weights=last --image=images/

* The output images with detections will be saved ‘outputs/’ folder under the same path in the same name as the original image. Few sample detections have already been placed in the folder.
* The program will automatically pick up the last checkpoint that was created and use those weights to train the model. To use an intermediate model, u can give the full path to the .h5 model instead of ‘last’ in the same command:

cd samples/buildings/

python3 building.py run\_image --weights=last --image=images/

To train the model, I have used pen source code of Mask R-CNN built in Keras by Matterport (available in GitHub: <https://github.com/matterport/Mask_RCNN> ) and built custom program using those base core modules for training the building dataset. I have also added Non-Maxima Suppression(NMS) to eliminate overlapping boxes to get a better result.