Object Detection Writup report

Overview

Object Detection is the key component of self-driving car systems. We do nothing if we did not understand what the object that around the car is, especially sign, persons, road...

The brower crash random because the limits of the VM memory size.

Set Up

It look like that the task is simple. It hides a lot of details using The Tensorflow Object Detection API. I have train the model many times because of the limit space of /home/workspace.

- View the Web brower in TruboVNC (the brower often crash).
- Write shell command in Web base vscode

In `Exploratory Data Analysis.ipynb` section, I just plots the images in Tfrecord.

Create new config

```
python edit_config.py --train_dir /home/workspace/data/train/ --eval_dir /home
/workspace/data/val/ --batch_size 2 --checkpoint /home/workspace/experiments/p
retrained_model/ssd_resnet50_v1_fpn_640x640_coco17_tpu-8/checkpoint/ckpt-0 --l
abel_map /home/workspace/experiments/label_map.pbtxt
```

Training

```
python experiments/model_main_tf2.py --model_dir=/home/backups/experiments/ref
erence/ --pipeline_config_path=experiments/reference/pipeline_new.config
```

I have to move the mode dir to /home/backups because of the limits space of /home/workspace

Evaluation

```
python experiments/model_main_tf2.py --model_dir=/home/backups/experiments
/reference/ --pipeline_config_path=experiments/reference/pipeline_new.config -
-checkpoint_dir=experiments/reference/
```

Exprting

```
python experiments/exporter_main_v2.py --input_type image_tensor --pipeline_co
nfig_path experiments/reference/pipeline_new.config --trained_checkpoint_dir e
xperiments/reference/ --output_directory experiments/reference/exported/
```

Inferenceing

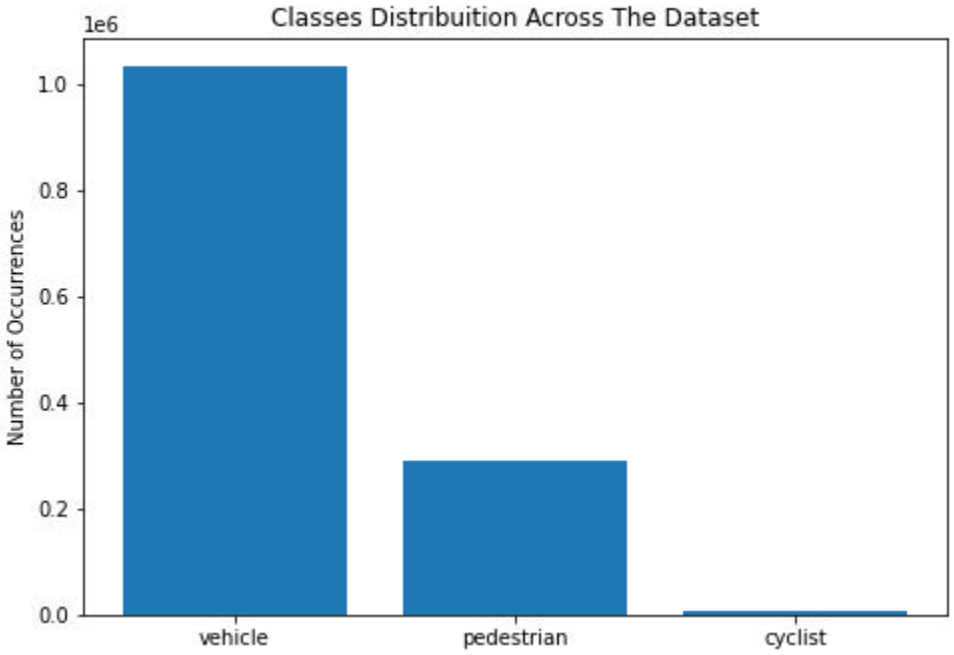
```
python inference_video.py --labelmap_path label_map.pbtxt --model_path experim
ents/reference/exported/saved_model --tf_record_path data/test/segment-1220038
3401366682847_2552_140_2572_140_with_camera_labels.tfrecord --config_path expe
riments/reference/pipeline_new.config --output_path animation.gif
```

Dataset

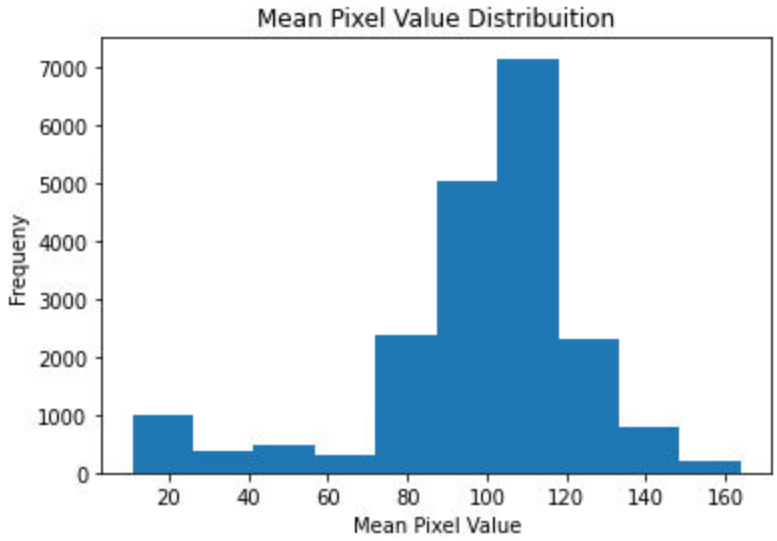
I have loaded 60000 images in this training dataset.

- 1035407 vehicles in the datasets
- 290753 pedestrains
- 7481 cyclists

```
{1: 1035407, 2: 290753, 4: 7481}
```

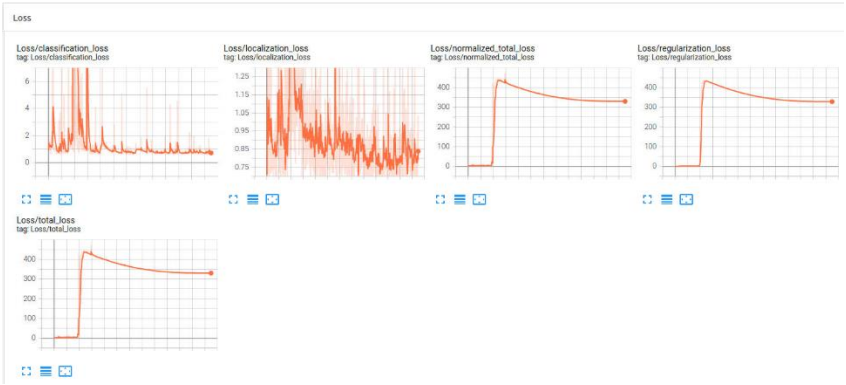


Below is the mean pixel value Distribution



Training

I have trained many times of this model with differents num_steps and some paramers.



2500 num_steps

4500 num_steps

It look like that the Detection is very well.

IMAGES TIME SERIES INACT

RESET

RESET

nce/

eval_side_by_side_0_0

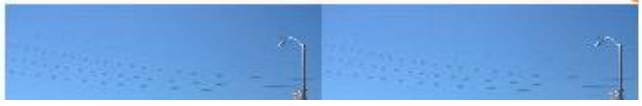
eval_side_by_side_0_0 eval
tag: eval_side_by_side_0_0
step **4,500** Sun Oct 30 2022 03:18:28 GMT+0000 (GMT)

eval_side_by_side_1_0

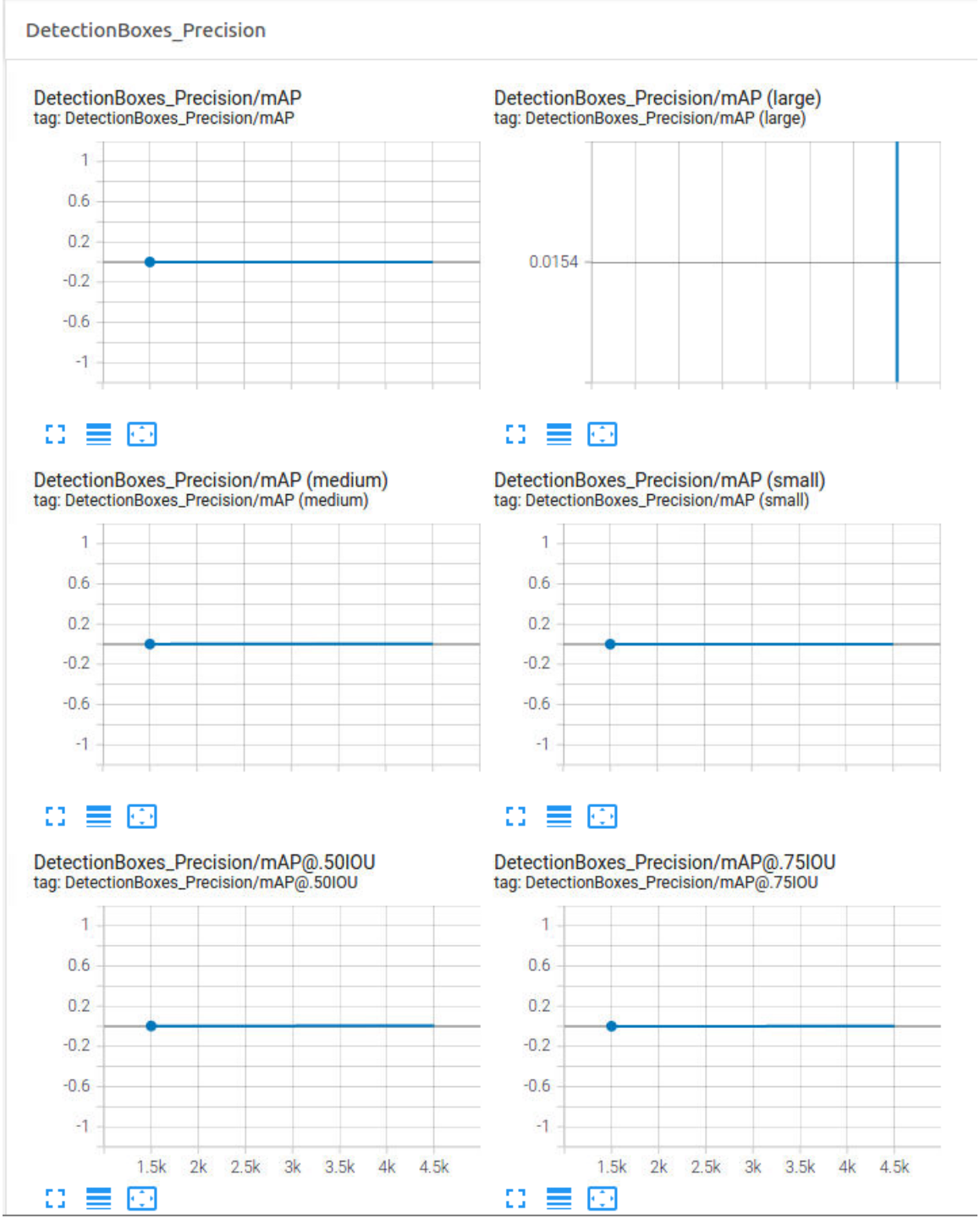
eval_side_by_side_1_0 eval
tag: eval_side_by_side_1_0
step **4,500** Sun Oct 30 2022 03:18:29 GMT+0000 (GMT)

eval_side_by_side_2_0

eval_side_by_side_2_0 eval
tag: eval_side_by_side_2_0
step **4,500** Sun Oct 30 2022 03:18:29 GMT+0000 (GMT)




vehicle: 100.0%
vehicle: 100.0%
vehicle: 100.0%
vehicle: 100.0%
vehicle: 100.0%



It just a blue dot in this image, If we run once of evaluation process. I changed the checkpoint_path in the checkpoint file.

I thinks there are some problem with this precision. But the evaluation image detection very well.