Importing Tensor flow. Also using the tensor flow models from

https://github.com/tensorflow/models

```
import os
import pathlib

if "models" in pathlib.Path.cwd().parts:
  while "models" in pathlib.Path.cwd().parts:
    os.chdir('..')
elif not pathlib.Path('models').exists():
  !git clone --depth 1 https://github.com/tensorflow/models
```

```
Cloning into 'models'...
remote: Enumerating objects: 3592, done.
remote: Counting objects: 100% (3592/3592), done.
remote: Compressing objects: 100% (2999/2999), done.
remote: Total 3592 (delta 947), reused 1515 (delta 539), pack-reused 0
Receiving objects: 100% (3592/3592), 47.08 MiB | 17.43 MiB/s, done.
Resolving deltas: 100% (947/947), done.
```

```
%%bash
# All models were stored in models folder. making all the below snippets to execute via ba

cd models/research/
protoc object_detection/protos/*.proto --python_out=.
cp object_detection/packages/tf2/setup.py .
python -m pip install .
```

```
Requirement already satisfied: lxml in /usr/local/lib/python3.8/dist-packages (fro
Requirement already satisfied: matplotlib in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: Cython in /usr/local/lib/python3.8/dist-packages (f
Requirement already satisfied: contextlib2 in /usr/local/lib/python3.8/dist-packag
Collecting tf-slim
  Downloading tf_slim-1.1.0-py2.py3-none-any.whl (352 kB)
Requirement already satisfied: six in /usr/local/lib/python3.8/dist-packages (from
Requirement already satisfied: pycocotools in /usr/local/lib/python3.8/dist-packag
Collecting lvis
  Downloading lvis-0.5.3-py3-none-any.whl (14 kB)
Requirement already satisfied: scipy in /usr/local/lib/python3.8/dist-packages (fr
Requirement already satisfied: pandas in /usr/local/lib/python3.8/dist-packages (f
Collecting tf-models-official>=2.5.1
  Downloading tf_models_official-2.11.1-py2.py3-none-any.whl (2.4 MB)
Collecting tensorflow_io
  Downloading tensorflow_io-0.28.0-cp38-cp38-manylinux_2_12_x86_64.manylinux2010_x
Requirement already satisfied: keras in /usr/local/lib/python3.8/dist-packages (fr
Collecting pyparsing==2.4.7
  Downloading pyparsing-2.4.7-py2.py3-none-any.whl (67 kB)
Collecting sacrebleu<=2.2.0
  Downloading sacrebleu-2.2.0-py3-none-any.whl (116 kB)
Requirement already satisfied: regex in /usr/local/lib/python3.8/dist-packages (fr
```

```
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.8/dist-packag
Requirement already satisfied: tabulate>=0.8.9 in /usr/local/lib/python3.8/dist-pa
Collecting colorama
  Downloading colorama-0.4.6-py2.py3-none-any.whl (25 kB)
Collecting portalocker
  Downloading portalocker-2.6.0-py2.py3-none-any.whl (15 kB)
Collecting immutabledict
  Downloading immutabledict-2.2.3-py3-none-any.whl (4.0 kB)
Requirement already satisfied: kaggle>=1.3.9 in /usr/local/lib/python3.8/dist-pack
Collecting sentencepiece
  Downloading sentencepiece-0.1.97-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x8
Collecting py-cpuinfo>=3.3.0
  Downloading py_cpuinfo-9.0.0-py3-none-any.whl (22 kB)
Collecting tensorflow-addons
  Downloading tensorflow_addons-0.19.0-cp38-cp38-manylinux_2_17_x86_64.manylinux20
Collecting tensorflow-model-optimization>=0.4.1
  Downloading tensorflow_model_optimization-0.7.3-py2.py3-none-any.whl (238 kB)
Collecting tf-models-official>=2.5.1
  Downloading tf_models_official-2.11.0-py2.py3-none-any.whl (2.3 MB)
Collecting tensorflow-text~=2.11.0
  Downloading tensorflow_text-2.11.0-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_
Collecting opencv-python-headless==4.5.2.52
  Downloading opencv_python_headless-4.5.2.52-cp38-cp38-manylinux2014_x86_64.whl (
Collecting tensorflow~=2.11.0
  Downloading tensorflow-2.11.0-cp38-cp38-manylinux_2_17_x86_64.manylinux2014_x86_
Collecting pyyaml<6.0,>=5.1
  Downloading PyYAML-5.4.1-cp38-cp38-manylinux1_x86_64.whl (662 kB)
Requirement already satisfied: tensorflow-datasets in /usr/local/lib/python3.8/dis
Requirement already satisfied: google-api-python-client>=1.6.7 in /usr/local/lib/py
Collecting seqeval
  Downloading seqeval-1.2.2.tar.gz (43 kB)
Requirement already satisfied: tensorflow-hub>=0.6.0 in /usr/local/lib/python3.8/d
Requirement already satisfied: psutil>=5.4.3 in /usr/local/lib/python3.8/dist-pack
Requirement already satisfied: oauth2client in /usr/local/lib/python3.8/dist-packa
Requirement already satisfied: gin-config in /usr/local/lib/python3.8/dist-package
```

```
# Here we are using matplotlib as plotting library

import matplotlib
import matplotlib.pyplot as plt

import os
import random
import io
import imageio
import glob
import scipy.misc
import numpy as np
from six import BytesIO
from PIL import Image, ImageDraw, ImageFont
from IPython.display import display, Javascript
from IPython.display import Image as IPyImage

import tensorflow as tf

from object_detection.utils import label_map_util
from object_detection.utils import config_util
```

```
from object_detection.utils import visualization_utils as viz_utils
from object_detection.utils import colab_utils
from object_detection.builders import model_builder

%matplotlib inline


# Running model_builder_tf2_test.py class for building the model.
# https://github.com/tensorflow/models/issues/9496 we have faced this issue while running

# Due credits to: https://github.com/S130111, @S130111

!python /content/models/research/object_detection/builders/model_builder_tf2_test.py
```

```
I1212 15:36:24.487228 140519905146752 efficientnet_model.py:453] Building model ef
I1212 15:36:24.578752 140519905146752 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:36:24.578900 140519905146752 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:36:24.578972 140519905146752 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:36:24.580753 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:24.598946 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:24.599061 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:24.870920 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:24.871096 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:25.466720 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:25.466897 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:26.042137 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:26.042315 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:26.868067 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:26.868237 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:27.684952 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:27.685117 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:28.760741 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:28.760912 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:29.109666 140519905146752 efficientnet_model.py:143] round_filter inpu
I1212 15:36:29.144718 140519905146752 efficientnet_model.py:453] Building model ef
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_create_ssd_models_from_conf
I1212 15:36:29.489341 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_create_ssd_models_from_config
[ RUN      ] ModelBuilderTF2Test.test_invalid_faster_rcnn_batchnorm_update
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_invalid_faster_rcnn_batchno
I1212 15:36:29.515592 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_invalid_faster_rcnn_batchnorm_update
[ RUN      ] ModelBuilderTF2Test.test_invalid_first_stage_nms_iou_threshold
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_invalid_first_stage_nms_iou
I1212 15:36:29.517273 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_invalid_first_stage_nms_iou_threshold
[ RUN      ] ModelBuilderTF2Test.test_invalid_model_config_proto
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_invalid_model_config_proto)
I1212 15:36:29.517825 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_invalid_model_config_proto
[ RUN      ] ModelBuilderTF2Test.test_invalid_second_stage_batch_size
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_invalid_second_stage_batch_
I1212 15:36:29.519325 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_invalid_second_stage_batch_size
[ RUN      ] ModelBuilderTF2Test.test_session
[  SKIPPED ] ModelBuilderTF2Test.test_session
[ RUN      ] ModelBuilderTF2Test.test_unknown_faster_rcnn_feature_extractor
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_unknown_faster_rcnn_feature
```

```
I1212 15:36:29.520730 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_unknown_faster_rcnn_feature_extractor
[ RUN      ] ModelBuilderTF2Test.test_unknown_meta_architecture
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_unknown_meta_architecture):
I1212 15:36:29.521191 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_unknown_meta_architecture
[ RUN      ] ModelBuilderTF2Test.test_unknown_ssd_feature_extractor
INFO:tensorflow:time(__main__.ModelBuilderTF2Test.test_unknown_ssd_feature_extract
I1212 15:36:29.522228 140519905146752 test_util.py:2457] time(__main__.ModelBuilde
[       OK ] ModelBuilderTF2Test.test_unknown_ssd_feature_extractor
----------------------------------------------------------------------
Ran 24 tests in 29.138s
```

```
# https://github.com/tensorflow/models/issues/2503
# Issues rectified from the above github issues

#loading images to numpy array calling this method and passing the image path as an arugme

def load_image_into_numpy_array(path):

  img_data = tf.io.gfile.GFile(path, 'rb').read()
  image = Image.open(BytesIO(img_data))
  (im_width, im_height) = image.size
  return np.array(image.getdata()).reshape(
      (im_height, im_width, 3)).astype(np.uint8)

def plot_detections(image_np,
                    boxes,
                    classes,
                    scores,
                    category_index,
                    figsize=(12, 16),
                    image_name=None):

  image_np_with_annotations = image_np.copy()
  viz_utils.visualize_boxes_and_labels_on_image_array(
      image_np_with_annotations,
      boxes,
      classes,
      scores,
      category_index,
      use_normalized_coordinates=True,
      min_score_thresh=0.8)
  if image_name:
    plt.imsave(image_name, image_np_with_annotations)
  else:
    plt.imshow(image_np_with_annotations)
```

we are using Roboflow for the image labelling process

Workspace: https://app.roboflow.com/dataminingsemo (Authorization is required please ask for the access)

We are using the free tier so the image labelling are limited to 200 images only

```
!pip install -q roboflow
from roboflow import Roboflow
rf = Roboflow(model_format="tfrecord", notebook="roboflow-tf2-od")
```

```
     |████████████████████████████████| 42 kB 777 kB/s
     |████████████████████████████████| 54 kB 3.0 MB/s
     |████████████████████████████████| 145 kB 10.6 MB/s
     |████████████████████████████████| 178 kB 69.7 MB/s
     |████████████████████████████████| 138 kB 76.4 MB/s
  Building wheel for wget (setup.py) ... done
upload and label your dataset, and get an API KEY here: https://app.roboflow.com/?mod
```

We need to insert API Key and the work space based on the creds roboflow downlods the images to temp folder in the google colab

Images are partioned into test and train by the roboflow

```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="K7rhlA6ufKMImR306fLL")
project = rf.workspace("kishore-kethineni").project("hard-hat-workers")
dataset = project.version(1).download("tfrecord")
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/p
Requirement already satisfied: roboflow in /usr/local/lib/python3.8/dist-packages (0
Requirement already satisfied: opencv-python-headless>=4.5.1.48 in /usr/local/lib/pyt
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.8/dist-pac
Requirement already satisfied: requests in /usr/local/lib/python3.8/dist-packages (fr
Requirement already satisfied: pyparsing==2.4.7 in /usr/local/lib/python3.8/dist-pack
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: glob2 in /usr/local/lib/python3.8/dist-packages (from
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.8/dist-packages
Requirement already satisfied: matplotlib in /usr/local/lib/python3.8/dist-packages (
Requirement already satisfied: chardet==4.0.0 in /usr/local/lib/python3.8/dist-packag
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: wget in /usr/local/lib/python3.8/dist-packages (from r
Requirement already satisfied: idna==2.10 in /usr/local/lib/python3.8/dist-packages (
Requirement already satisfied: python-dotenv in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.8/dist-package
Requirement already satisfied: certifi==2021.5.30 in /usr/local/lib/python3.8/dist-pa
Requirement already satisfied: urllib3==1.26.6 in /usr/local/lib/python3.8/dist-packa
Requirement already satisfied: cycler==0.10.0 in /usr/local/lib/python3.8/dist-packag
```

```
Requirement already satisfied: requests-toolbelt in /usr/local/lib/python3.8/dist-pac
Requirement already satisfied: six in /usr/local/lib/python3.8/dist-packages (from rc
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.8/dist-packa
Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/python3.8/c
loading Roboflow workspace...
loading Roboflow project...
Downloading Dataset Version Zip in Hard-Hat-Workers-1 to tfrecord: 98% [234463232 / 2
```

```
# Assingning paths to the variables
test_record_fname = dataset.location + '/test/Workers.tfrecord'
train_record_fname = dataset.location + '/train/Workers.tfrecord'
label_map_pbtxt_fname = dataset.location + '/train/Workers_label_map.pbtxt'
```

We configuring the tensorflow model here

So, we have chosen the model from [TF2 OD model zoo] and set up your training configuration.

```
MODELS_CONFIG = {
    'efficientdet-d0': {
        'model_name': 'efficientdet_d0_coco17_tpu-32',
        'base_pipeline_file': 'ssd_efficientdet_d0_512x512_coco17_tpu-8.config',
        'pretrained_checkpoint': 'efficientdet_d0_coco17_tpu-32.tar.gz',
        'batch_size': 16
    },
    'efficientdet-d1': {
        'model_name': 'efficientdet_d1_coco17_tpu-32',
        'base_pipeline_file': 'ssd_efficientdet_d1_640x640_coco17_tpu-8.config',
        'pretrained_checkpoint': 'efficientdet_d1_coco17_tpu-32.tar.gz',
        'batch_size': 16
    },
    'efficientdet-d2': {
        'model_name': 'efficientdet_d2_coco17_tpu-32',
        'base_pipeline_file': 'ssd_efficientdet_d2_768x768_coco17_tpu-8.config',
        'pretrained_checkpoint': 'efficientdet_d2_coco17_tpu-32.tar.gz',
        'batch_size': 16
    },
        'efficientdet-d3': {
        'model_name': 'efficientdet_d3_coco17_tpu-32',
        'base_pipeline_file': 'ssd_efficientdet_d3_896x896_coco17_tpu-32.config',
        'pretrained_checkpoint': 'efficientdet_d3_coco17_tpu-32.tar.gz',
        'batch_size': 16
    }
}
```

```
chosen_model = 'efficientdet-d0'

num_steps = 6000 #We decresed the steps as our systems doesn't suppourt the high GPU.
num_eval_steps = 100 #Perform evaluation after so many steps

model_name = MODELS_CONFIG[chosen_model]['model_name']
```

```
pretrained_checkpoint = MODELS_CONFIG[chosen_model]['pretrained_checkpoint']
base_pipeline_file = MODELS_CONFIG[chosen_model]['base_pipeline_file']
batch_size = MODELS_CONFIG[chosen_model]['batch_size']


#downloading the weights if pre trained are availble
%mkdir /content/models/research/deploy/
%cd /content/models/research/deploy/
import tarfile
download_tar = 'http://download.tensorflow.org/models/object_detection/tf2/20200711/' + pr

!wget {download_tar}
tar = tarfile.open(pretrained_checkpoint)
tar.extractall()
tar.close()
```

```
/content/models/research/deploy
--2022-12-12 15:41:32--  http://download.tensorflow.org/models/object_detection/tf2/2
Resolving download.tensorflow.org (download.tensorflow.org)... 74.125.31.128, 2607:f8
Connecting to download.tensorflow.org (download.tensorflow.org)|74.125.31.128|:80...
HTTP request sent, awaiting response... 200 OK
Length: 30736482 (29M) [application/x-tar]
Saving to: ‘efficientdet_d0_coco17_tpu-32.tar.gz’

efficientdet_d0_coc 100%[===================>]  29.31M   145MB/s    in 0.2s

2022-12-12 15:41:32 (145 MB/s) - ‘efficientdet_d0_coco17_tpu-32.tar.gz’ saved [307364
```

```
# We are downloading the training configuration file
%cd /content/models/research/deploy
download_config = 'https://raw.githubusercontent.com/tensorflow/models/master/research/obj
!wget {download_config}
```

```
/content/models/research/deploy
--2022-12-12 15:41:37--  https://raw.githubusercontent.com/tensorflow/models/master/r
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.108.133, 1
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.108.133|
HTTP request sent, awaiting response... 200 OK
Length: 4630 (4.5K) [text/plain]
Saving to: ‘ssd_efficientdet_d0_512x512_coco17_tpu-8.config’

ssd_efficientdet_d0 100%[===================>]   4.52K  --.-KB/s    in 0s

2022-12-12 15:41:37 (66.6 MB/s) - ‘ssd_efficientdet_d0_512x512_coco17_tpu-8.config’ s
```

```
#preparing the data

pipeline_fname = '/content/models/research/deploy/' + base_pipeline_file
fine_tune_checkpoint = '/content/models/research/deploy/' + model_name + '/checkpoint/ckpt

def get_num_classes(pbtxt_fname):
```

```
    from object_detection.utils import label_map_util
    label_map = label_map_util.load_labelmap(pbtxt_fname)
    categories = label_map_util.convert_label_map_to_categories(
        label_map, max_num_classes=90, use_display_name=True)
    category_index = label_map_util.create_category_index(categories)
    return len(category_index.keys())
num_classes = get_num_classes(label_map_pbtxt_fname)


# Assinging the configured variables to start the training

import re

%cd /content/models/research/deploy
print('writing custom configuration file')

with open(pipeline_fname) as f:
    s = f.read()
with open('pipeline_file.config', 'w') as f:


    s = re.sub('fine_tune_checkpoint: ".*?"',
               'fine_tune_checkpoint: "{}"'.format(fine_tune_checkpoint), s)

    s = re.sub(
        '(input_path: ".*?)(PATH_TO_BE_CONFIGURED/train)(.*?")', 'input_path: "{}"'.format
    s = re.sub(
        '(input_path: ".*?)(PATH_TO_BE_CONFIGURED/val)(.*?")', 'input_path: "{}"'.format(t

    s = re.sub(
        'label_map_path: ".*?"', 'label_map_path: "{}"'.format(label_map_pbtxt_fname), s)

    s = re.sub('batch_size: [0-9]+',
               'batch_size: {}'.format(batch_size), s)

    s = re.sub('num_steps: [0-9]+',
               'num_steps: {}'.format(num_steps), s)

    s = re.sub('num_classes: [0-9]+',
               'num_classes: {}'.format(num_classes), s)

    s = re.sub(
        'fine_tune_checkpoint_type: "classification"', 'fine_tune_checkpoint_type: "{}"'.f

    f.write(s)



 /content/models/research/deploy
 writing custom configuration file


%cat /content/models/research/deploy/pipeline_file.config
  fine_tune_checkpoint: "/content/models/research/deploy/efficientdet_d0_coco17_tp
  fine_tune_checkpoint_version: V2
```

```
    fine_tune_checkpoint_type: "detection"
    batch_size: 16
    sync_replicas: true
    startup_delay_steps: 0
    replicas_to_aggregate: 8
    use_bfloat16: true
    num_steps: 6000
    data_augmentation_options {
      random_horizontal_flip {
      }
    }
    data_augmentation_options {
      random_scale_crop_and_pad_to_square {
        output_size: 512
        scale_min: 0.1
        scale_max: 2.0
      }
    }
    optimizer {
      momentum_optimizer: {
        learning_rate: {
          cosine_decay_learning_rate {
            learning_rate_base: 8e-2
            total_steps: 300000
            warmup_learning_rate: .001
            warmup_steps: 2500
          }
        }
        momentum_optimizer_value: 0.9
      }
      use_moving_average: false
    }
    max_number_of_boxes: 100
    unpad_groundtruth_tensors: false
  }

  train_input_reader: {
    label_map_path: "/content/Hard-Hat-Workers-1/train/Workers_label_map.pbtxt"
    tf_record_input_reader {
      input_path: "/content/Hard-Hat-Workers-1/train/Workers.tfrecord"
    }
  }

  eval_config: {
    metrics_set: "coco_detection_metrics"
    use_moving_averages: false
    batch_size: 16;
  }

  eval_input_reader: {
    label_map_path: "/content/Hard-Hat-Workers-1/train/Workers_label_map.pbtxt"
    shuffle: false
    num_epochs: 1
    tf_record_input_reader {
      input_path: "/content/Hard-Hat-Workers-1/test/Workers.tfrecord"
```

```
pipeline_file = '/content/models/research/deploy/pipeline_file.config'
model_dir = '/content/training/'
```

Train Custom TF2 Object Detector

- pipeline_file: defined above in writing custom training configuration
- model_dir: the location tensorboard logs and saved model checkpoints will save to
- num_train_steps: how long to train for
- num_eval_steps: perform eval on validation set after this many steps

```
!python /content/models/research/object_detection/model_main_tf2.py \
    --pipeline_config_path={pipeline_file} \
    --model_dir={model_dir} \
    --alsologtostderr \
    --num_train_steps={num_steps} \
    --sample_1_of_n_eval_examples=1 \
    --num_eval_steps={num_eval_steps}
```

```
2022-12-12 15:41:58.554869: W tensorflow/compiler/xla/stream_executor/platform/def
2022-12-12 15:41:58.554977: W tensorflow/compiler/xla/stream_executor/platform/def
2022-12-12 15:41:58.554996: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38
2022-12-12 15:42:02.322261: W tensorflow/core/common_runtime/gpu/gpu_bfc_allocator
INFO:tensorflow:Using MirroredStrategy with devices ('/job:localhost/replica:0/tas
I1212 15:42:02.337654 139907366107008 mirrored_strategy.py:374] Using MirroredStra
INFO:tensorflow:Maybe overwriting train_steps: 6000
I1212 15:42:02.341354 139907366107008 config_util.py:552] Maybe overwriting train_
INFO:tensorflow:Maybe overwriting use_bfloat16: False
I1212 15:42:02.341536 139907366107008 config_util.py:552] Maybe overwriting use_bf
I1212 15:42:02.351927 139907366107008 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:42:02.352036 139907366107008 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:42:02.352105 139907366107008 ssd_efficientnet_bifpn_feature_extractor.py:
I1212 15:42:02.355915 139907366107008 efficientnet_model.py:143] round_filter input
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.387209 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.390020 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.391836 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.392727 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.399459 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.402720 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
I1212 15:42:02.408243 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:02.408354 139907366107008 efficientnet_model.py:143] round_filter input
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.423589 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.424471 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.426193 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
INFO:tensorflow:Reduce to /job:localhost/replica:0/task:0/device:CPU:0 then broadc
I1212 15:42:02.427087 139907366107008 cross_device_ops.py:616] Reduce to /job:loca
I1212 15:42:02.514971 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:02.515087 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:02.792751 139907366107008 efficientnet_model.py:143] round_filter input
```

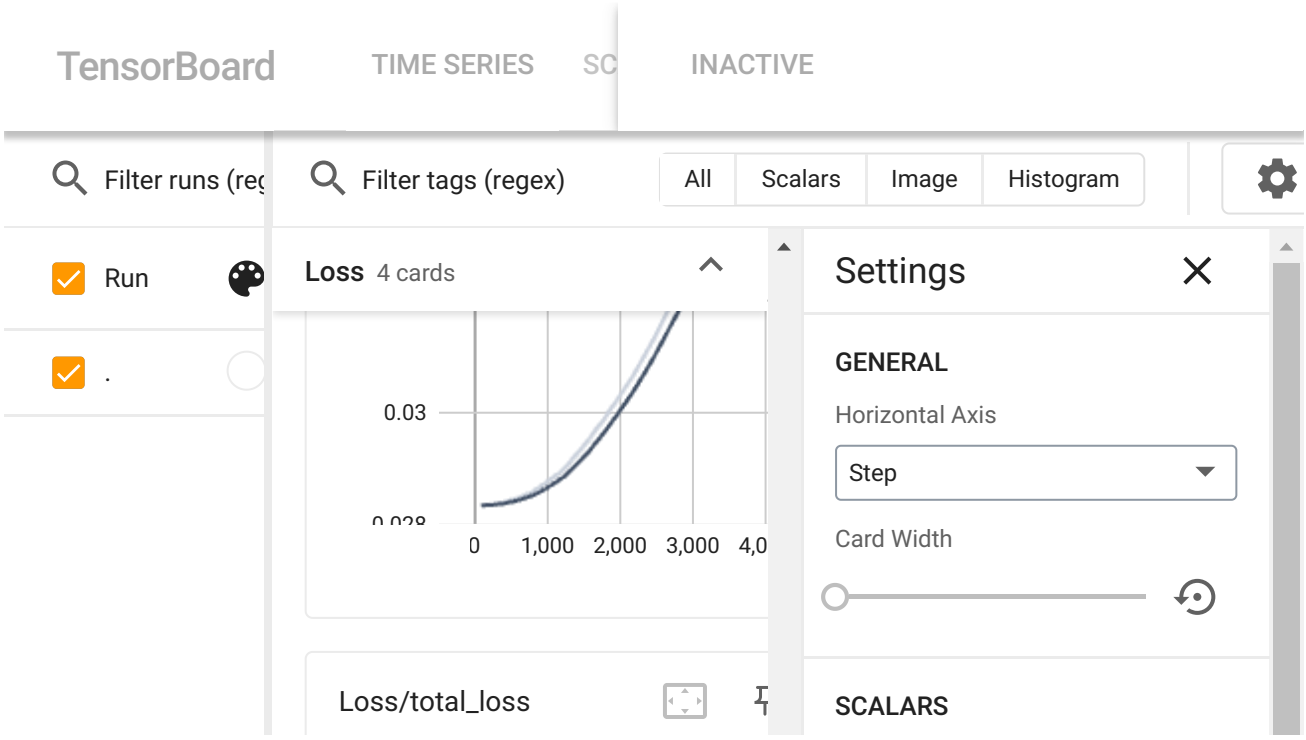
```
I1212 15:42:02.792908 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.065835 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.066007 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.474219 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.474382 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.882447 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:03.882629 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:04.417368 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:04.417541 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:04.544707 139907366107008 efficientnet_model.py:143] round_filter input
I1212 15:42:04.605014 139907366107008 efficientnet_model.py:453] Building model ef
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/object_detection/mo
Instructions for updating:
rename to distribute_datasets_from_function
W1212 15:42:04.639672 139907366107008 deprecation.py:350] From /usr/local/lib/pyth
Instructions for updating:
rename to distribute_datasets_from_function
INFO:tensorflow:Reading unweighted datasets: ['/content/Hard_Hat_Workers_1/train/W
```

```
#Evaluating model

# unable to evaluate the model due to file 404 errs
!python /content/models/research/object_detection/model_main_tf2.py \
    --pipeline_config_path={pipeline_file} \
    --model_dir={model_dir} \
    --checkpoint_dir={model_dir} \
```

```
Use  tf.data.Dataset.map()
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/tensorflow/python/a
Instructions for updating:
Lambda fuctions will be no more assumed to be used in the statement where they are
W1210 06:56:01.425109 139776142206848 deprecation.py:350] From /usr/local/lib/pyth
Instructions for updating:
Lambda fuctions will be no more assumed to be used in the statement where they are
Traceback (most recent call last):


During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/content/models/research/object_detection/model_main_tf2.py", line 114, in
    tf.compat.v1.app.run()
  File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/platform/app.py",
    _run(main=main, argv=argv, flags_parser=_parse_flags_tolerate_undef)
  File "/usr/local/lib/python3.8/dist-packages/absl/app.py", line 308, in run
    _run_main(main, args)
  File "/usr/local/lib/python3.8/dist-packages/absl/app.py", line 254, in _run_mai
    sys.exit(main(argv))
  File "/content/models/research/object_detection/model_main_tf2.py", line 81, in r
    model_lib_v2.eval_continuously(
  File "/usr/local/lib/python3.8/dist-packages/object_detection/model_lib_v2.py",
    inputs.eval_input(
  File "/usr/local/lib/python3.8/dist-packages/object_detection/inputs.py", line 1
    dataset = INPUT_BUILDER_UTIL_MAP['dataset_build'](
  File "/usr/local/lib/python3.8/dist-packages/object_detection/builders/dataset_b
    dataset = dataset_map_fn(dataset, transform_input_data_fn,
  File "/usr/local/lib/python3.8/dist-packages/object_detection/builders/dataset_b
    dataset = dataset.map_with_legacy_function(
  File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/util/deprecation
```

```
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/util/deprecation.
      return func(*args, **kwargs)
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/data/ops/dataset_
      ParallelMapDataset(
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/data/ops/dataset_
      self._map_func = structured_function.StructuredFunctionWrapper(
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/data/ops/structur
      self._function.add_to_graph(ops.get_default_graph())
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/framework/functio
      self._create_definition_if_needed()
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/framework/functio
      self._create_definition_if_needed_impl()
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/framework/functio
      temp_graph = func_graph_from_py_func(
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/framework/functio
      outputs = func(*func_graph.inputs)
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/data/ops/structur
      ret = wrapper_helper(*args)
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/data/ops/structur
      ret = autograph.tf_convert(self._func, ag_ctx)(*nested_args)
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/autograph/impl/ap
      return converted_call(f, args, kwargs, options=options)
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/autograph/impl/ap
      raise
    File "/usr/local/lib/python3.8/dist-packages/tensorflow/python/util/tf_stack.py"
      assert top is self, 'Concurrent access?'
AssertionError: Concurrent access?
```

```
# Opeining the tensor board for the loass calsification graphs

%load_ext tensorboard
%tensorboard --logdir '/content/training/train'
```




```
#Checking the weights that has been generated
%ls '/content/training/'
```

```
checkpoint                   ckpt-4.index
ckpt-1.data-00000-of-00001   ckpt-5.data-00000-of-00001
ckpt-1.index                 ckpt-5.index
ckpt-2.data-00000-of-00001   ckpt-6.data-00000-of-00001
ckpt-2.index                 ckpt-6.index
ckpt-3.data-00000-of-00001   ckpt-7.data-00000-of-00001
ckpt-3.index                 ckpt-7.index
ckpt-4.data-00000-of-00001   train/
```

```
#Conversion script from check points to the fine tuned models
import re
import numpy as np

output_directory = '/content/fine_tuned_model'

last_model_path = '/content/training/'
print(last_model_path)
!python /content/models/research/object_detection/exporter_main_v2.py \
    --trained_checkpoint_dir {last_model_path} \
    --output_directory {output_directory} \
    --pipeline_config_path {pipeline_file}
```

```
/content/training/
2022-12-12 17:50:29.209194: W tensorflow/compiler/xla/stream_executor/platform/defaul
2022-12-12 17:50:29.209317: W tensorflow/compiler/xla/stream_executor/platform/defaul
2022-12-12 17:50:29.209341: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] T
2022-12-12 17:50:32.783927: W tensorflow/core/common_runtime/gpu/gpu_bfc_allocator.cc
I1212 17:50:32.802283 140136509278080 ssd_efficientnet_bifpn_feature_extractor.py:156
I1212 17:50:32.802484 140136509278080 ssd_efficientnet_bifpn_feature_extractor.py:152
I1212 17:50:32.802580 140136509278080 ssd_efficientnet_bifpn_feature_extractor.py:153
I1212 17:50:32.806450 140136509278080 efficientnet_model.py:143] round_filter input=3
I1212 17:50:32.839525 140136509278080 efficientnet_model.py:143] round_filter input=3
```

```
I1212 17:50:32.839637 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:32.912564 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:32.912683 140136509278080 efficientnet_model.py:143] round_filter input=2
I1212 17:50:33.098797 140136509278080 efficientnet_model.py:143] round_filter input=2
I1212 17:50:33.098933 140136509278080 efficientnet_model.py:143] round_filter input=4
I1212 17:50:33.275032 140136509278080 efficientnet_model.py:143] round_filter input=4
I1212 17:50:33.275166 140136509278080 efficientnet_model.py:143] round_filter input=8
I1212 17:50:33.538585 140136509278080 efficientnet_model.py:143] round_filter input=8
I1212 17:50:33.538731 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:33.819666 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:33.819845 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:34.169600 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:34.169751 140136509278080 efficientnet_model.py:143] round_filter input=3
I1212 17:50:34.253660 140136509278080 efficientnet_model.py:143] round_filter input=1
I1212 17:50:34.294231 140136509278080 efficientnet_model.py:453] Building model effic
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/tensorflow/python/autc
Instructions for updating:
Lambda fuctions will be no more assumed to be used in the statement where they are us
W1212 17:50:36.226141 140136509278080 deprecation.py:350] From /usr/local/lib/python3
Instructions for updating:
Lambda fuctions will be no more assumed to be used in the statement where they are us
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/tensorflow/python/autc
Instructions for updating:
back_prop=False is deprecated. Consider using tf.stop_gradient instead.
Instead of:
results = tf.map_fn(fn, elems, back_prop=False)
Use:
results = tf.nest.map_structure(tf.stop_gradient, tf.map_fn(fn, elems))
W1212 17:50:36.290279 140136509278080 deprecation.py:623] From /usr/local/lib/python3
Instructions for updating:
back_prop=False is deprecated. Consider using tf.stop_gradient instead.
Instead of:
results = tf.map_fn(fn, elems, back_prop=False)
Use:
results = tf.nest.map_structure(tf.stop_gradient, tf.map_fn(fn, elems))
WARNING:tensorflow:Skipping full serialization of Keras layer <object_detection.meta_
W1212 17:50:57.444684 140136509278080 save_impl.py:66] Skipping full serialization of
W1212 17:51:39.559420 140136509278080 save.py:271] Found untraced functions such as W
INFO:tensorflow:Assets written to: /content/fine_tuned_model/saved_model/assets
I1212 17:52:01.517165 140136509278080 builder_impl.py:797] Assets written to: /conter
INFO:tensorflow:Writing pipeline config file to /content/fine_tuned_model/pipeline.cc
I1212 17:52:03.865818 140136509278080 config_util.py:253] Writing pipeline config fil
```

```
%ls '/content/fine_tuned_model/saved_model/'
# cehcking the contents of saved models
```

```
assets/  fingerprint.pb  saved_model.pb  variables/
```

Finally we running the inference test on the model

```
#We are downloading the test images from the test folder which we have created in the robo
#We are exporting the data to coco data set

%mkdir /content/test/
```

```
%cd /content/test/
!curl -L "https://public.roboflow.com/ds/su3WQnrFJL?key=p34m3b8TGI" > roboflow.zip; unzip
```

```
  extracting: train/003799_jpg.rf.fbc745758b30f726a2b4fcc3bf3e2d5c.jpg
  extracting: train/004413_jpg.rf.fc535b27ed6f0bb6dc9755e85321cba7.jpg
  extracting: train/004562_jpg.rf.fbfeff522deab2d07727fcb1e4729d2e.jpg
  extracting: train/003814_jpg.rf.fc5d82ac4cb0e5f93f1f49f69cbe46ca.jpg
  extracting: train/002465_jpg.rf.fb4fd20586a2a04f56f6775da1145b4d.jpg
  extracting: train/002186_jpg.rf.fa7873941284b839fc2cda1dbb9c2af4.jpg
  extracting: train/000843_jpg.rf.fc5315398b5fea8eed41d4dd22563052.jpg
  extracting: train/004212_jpg.rf.fc49651b600f6cb1d8f4ed49e05d4a44.jpg
  extracting: train/000120_jpg.rf.fbf9acf2b8d367208218c8015ea7c71e.jpg
  extracting: train/000024_jpg.rf.fc6155dbd1378d9c5ced8ae8cabd6181.jpg
  extracting: train/001932_jpg.rf.fb98a79fd4657d9d7b9785dfd9946878.jpg
  extracting: train/003661_jpg.rf.fc243eb4ec404008c582daacf54ccd98.jpg
  extracting: train/001009_jpg.rf.fc7e83d8aa3c39d1fd34b48498edf529.jpg
  extracting: train/004959_jpg.rf.fc71c3e39c93d04d6a479bb60bc643d6.jpg
  extracting: train/001114_jpg.rf.fc69f6dbae68dc84fb7da585102990b7.jpg
  extracting: train/004586_jpg.rf.fca914daa2a24be439fcafe66c05f61c.jpg
  extracting: train/001837_jpg.rf.fc82d09ebf3e6128d48e02f54b7d7ae8.jpg
  extracting: train/000640_jpg.rf.fcdd2a3421dca1cc6193912b6593247e.jpg
  extracting: train/001066_jpg.rf.fc7cc02f8762a9e81bddd07a97fad1c3.jpg
  extracting: train/002032_jpg.rf.fcbee5ccfc90cc9b2c99d859360ca3d1.jpg
  extracting: train/004868_jpg.rf.fcc157091b840a4badee1c29f1915e04.jpg
  extracting: train/001316_jpg.rf.fd2577897ad250f9efcf0094ec8f8ecd.jpg
  extracting: train/002402_jpg.rf.fcda61949bb293732ab78fba964bf2ee.jpg
  extracting: train/001539_jpg.rf.fcb888c132839220ca4315b8c94d01f7.jpg
  extracting: train/001046_jpg.rf.fd04ada8ed7f9f46e0feb89014bec548.jpg
  extracting: train/000877_jpg.rf.fceb4a3881fb86520247df96038b8f53.jpg
  extracting: train/002869_jpg.rf.fd14370cc8f062eb37e11a11ce59a8a5.jpg
  extracting: train/002855_jpg.rf.fd3ab956f9a83ce0d64cc8499c274f07.jpg
  extracting: train/003689_jpg.rf.fd5cd07b7864dae4cb835936490333bf.jpg
  extracting: train/005124_jpg.rf.fd6eef75ebafaa48aa0b494fc7667d18.jpg
  extracting: train/002757_jpg.rf.fdd99a921aaddd6d9c0361e5f37d1948.jpg
  extracting: train/002802_jpg.rf.fe294d1e25a51bf2a01d2cfe99e6aed6.jpg
  extracting: train/000768_jpg.rf.fd3da485b1f6e24f7bfb443d42d0aac3.jpg
  extracting: train/001435_jpg.rf.fd1d8fd9ba5c73a5cdd4a1d118b09154.jpg
  extracting: train/001400_jpg.rf.fd702145b3ea80a77f5ec9e02474040e.jpg
  extracting: train/001021_jpg.rf.fcec6056780e55bdf1216947ed379daf.jpg
  extracting: train/002615_jpg.rf.fd87ae70f23ba1e740f651bc2717acc1.jpg
  extracting: train/001376_jpg.rf.fda703f2db72f818b236eb851bdfd2bd.jpg
  extracting: train/000021_jpg.rf.fdc55ecd2faffc17938e897515db461f.jpg
  extracting: train/003057_jpg.rf.fe2cd6bca86e6c0a3dd3d199c1cd3fbf.jpg
  extracting: train/002594_jpg.rf.feb9394e299581f503c23f6bcf2452b6.jpg
  extracting: train/001832_jpg.rf.fe214eb42e16a5cbfe9216bbdc5fb8a1.jpg
  extracting: train/005015_jpg.rf.fe58279efda09a5dd42c74dbe2992eca.jpg
  extracting: train/002203_jpg.rf.fea5ad6a21320db48ceb508d8fa76af5.jpg
  extracting: train/002162_jpg.rf.fec46a386fbf54e8045e6554a7bf0182.jpg
  extracting: train/002693_jpg.rf.fcf7813ea6bbf93abfdacbae3c01f428.jpg
  extracting: train/005161_jpg.rf.fef8178e42fa75c41c6cc3d51238e98a.jpg
  extracting: train/002857_jpg.rf.fe1dfbd1ecd0c71a64fa55b6a3da97bb.jpg
  extracting: train/003322_jpg.rf.fe2aa6f92896e5ff18ca121a6db11318.jpg
  extracting: train/002482_jpg.rf.fedc4ef736189c8db4cf5ec73aa3ce38.jpg
  extracting: train/002015_jpg.rf.fedcfe1c7a0c05daada87a48df8c803b.jpg
  extracting: train/001394_jpg.rf.ff55dcfb8b93a20b7495008bedb47655.jpg
  extracting: train/001246_jpg.rf.ff4344325e324e86dc7cef251ea42b8f.jpg
  extracting: train/001226_jpg.rf.fed4344fb32d5bcd9f93062922f02d06.jpg
  extracting: train/001124_jpg.rf.ff58d12cb1bb5ade84371f26d2f44d62.jpg
  extracting: train/000311_jpg.rf.ff5d7bffd43ede7b4bff19af7a64de7d.jpg
  extracting: train/005047_jpg.rf.feffc991cda3c13d48ef79347d394b21.jpg
```

```
      extracting: train/000872_jpg.rf.ff8a5b95497...
      extracting: train/002863_jpg.rf.ff4da781a4e...
```

```
# importing the objects

import matplotlib
import matplotlib.pyplot as plt

import io
import scipy.misc
import numpy as np
from six import BytesIO
from PIL import Image, ImageDraw, ImageFont

import tensorflow as tf

from object_detection.utils import label_map_util
from object_detection.utils import config_util
from object_detection.utils import visualization_utils as viz_utils
from object_detection.builders import model_builder

%matplotlib inline


def load_image_into_numpy_array(path):
  img_data = tf.io.gfile.GFile(path, 'rb').read()
  image = Image.open(BytesIO(img_data))
  (im_width, im_height) = image.size
  return np.array(image.getdata()).reshape(
      (im_height, im_width, 3)).astype(np.uint8)


%ls '/content/training/'
```

```
     checkpoint                  ckpt-4.index
     ckpt-1.data-00000-of-00001  ckpt-5.data-00000-of-00001
     ckpt-1.index                ckpt-5.index
     ckpt-2.data-00000-of-00001  ckpt-6.data-00000-of-00001
     ckpt-2.index                ckpt-6.index
     ckpt-3.data-00000-of-00001  ckpt-7.data-00000-of-00001
     ckpt-3.index                ckpt-7.index
     ckpt-4.data-00000-of-00001  train/
```

```
import pathlib

filenames = list(pathlib.Path('/content/training/').glob('*.index'))

filenames.sort()
print(filenames)

pipeline_config = pipeline_file
model_dir = str(filenames[-1]).replace('.index','')
configs = config_util.get_configs_from_pipeline_file(pipeline_config)
model_config = configs['model']
detection_model = model_builder.build(
      model_config=model_config, is_training=False)
```

```
ckpt = tf.compat.v2.train.Checkpoint(
      model=detection_model)
ckpt.restore(os.path.join(str(filenames[-1]).replace('.index','')))


def get_model_detection_function(model):

  @tf.function
  def detect_fn(image):

    image, shapes = model.preprocess(image)
    prediction_dict = model.predict(image, shapes)
    detections = model.postprocess(prediction_dict, shapes)

    return detections, prediction_dict, tf.reshape(shapes, [-1])

  return detect_fn

detect_fn = get_model_detection_function(detection_model)
```

```
[PosixPath('/content/training/ckpt-1.index'), PosixPath('/content/training/ckpt-2.inc
```

```
#map labels for inference decoding
label_map_path = configs['eval_input_config'].label_map_path
label_map = label_map_util.load_labelmap(label_map_path)
categories = label_map_util.convert_label_map_to_categories(
    label_map,
    max_num_classes=label_map_util.get_max_label_map_index(label_map),
    use_display_name=True)
category_index = label_map_util.create_category_index(categories)
label_map_dict = label_map_util.get_label_map_dict(label_map, use_display_name=True)


#run detector on test image
#it takes a little longer on the first run
import random

TEST_IMAGE_PATHS = glob.glob('/content/test/test/*.jpg')
image_path = random.choice(TEST_IMAGE_PATHS)
image_np = load_image_into_numpy_array(image_path)

input_tensor = tf.convert_to_tensor(
    np.expand_dims(image_np, 0), dtype=tf.float32)
detections, predictions_dict, shapes = detect_fn(input_tensor)

label_id_offset = 1
image_np_with_detections = image_np.copy()

viz_utils.visualize_boxes_and_labels_on_image_array(
      image_np_with_detections,
      detections['detection_boxes'][0].numpy(),
      (detections['detection_classes'][0].numpy() + label_id_offset).astype(int),
      detections['detection_scores'][0].numpy(),
      category_index
```

```
        category_index,
        use_normalized_coordinates=True,
        max_boxes_to_draw=200,
        min_score_thresh=.5,
        agnostic_mode=False,
    )

    plt.figure(figsize=(12,16))
    plt.imshow(image_np_with_detections)
    plt.show()
```

```
WARNING:tensorflow:From /usr/local/lib/python3.8/dist-packages/tensorflow/python/autc
Instructions for updating:
Lambda fuctions will be no more assumed to be used in the statement where they are us
```

Thank You

- Kishore Kethineni
- Ravi Shankar Gurram
- Karthik Gundu
- Abdul Khadeer Munthamadugu Dudekula
- Keerthana Ravella
- Sravani Gutta

✓ 22s completed at 11:53