LIVERPOOL JOHN MOORES UNIVERSITY

In [14]:
```python
import matplotlib.pyplot as plt
%matplotlib inline
```

Object Detection From TF2 Saved Model

In [2]:
```python
import os
os.environ['TF_CPP_MIN_LOG_LEVEL'] = '2'    # Suppress TensorFlow logging (1)
import pathlib
import tensorflow as tf

tf.get_logger().setLevel('ERROR')           # Suppress TensorFlow logging (2)


# Enable GPU dynamic memory allocation
gpus = tf.config.experimental.list_physical_devices('GPU')
for gpu in gpus:
    tf.config.experimental.set_memory_growth(gpu, True)

IMAGE_PATHS = 'test_images/'
```

Set the path to the model

In [3]:
```python
#PATH_TO_MODEL = "faster_rcnn_resnet101_v1_640x640_coco17_tpu-8"
PATH_TO_MODEL = "faster_rcnn_resnet101_v1_1024x1024_coco17_tpu-8"
#PATH_TO_MODEL = "efficientdet_d3_coco17_tpu-32"
#PATH_TO_MODEL = "efficientdet_d4_coco17_tpu-32"
#PATH_TO_MODEL = "centernet_hg104_1024x1024_coco17_tpu-32"
```

In [4]:
```python
PATH_TO_MODEL_DIR = './training/TF2/training/{}/saved_model/saved_model/'.for
```

In [5]:
```python
print(PATH_TO_MODEL_DIR)
```

```
./training/TF2/training/faster_rcnn_resnet101_v1_1024x1024_coco17_tpu-8/sav
ed_model/saved_model/
```

In [6]:
```python
PATH_TO_LABELS = './data/label_map.pbtxt'
```

In [7]:
```python
import time
from object_detection.utils import label_map_util
from object_detection.utils import visualization_utils as viz_utils

PATH_TO_SAVED_MODEL = PATH_TO_MODEL_DIR

print('Loading model...', end='')
start_time = time.time()

# Load saved model and build the detection function
detect_fn = tf.saved_model.load(PATH_TO_SAVED_MODEL)

end_time = time.time()
elapsed_time = end_time - start_time
print('Done! Took {} seconds'.format(elapsed_time))
```

```
Loading model...Done! Took 6.1561901569366455 seconds
```

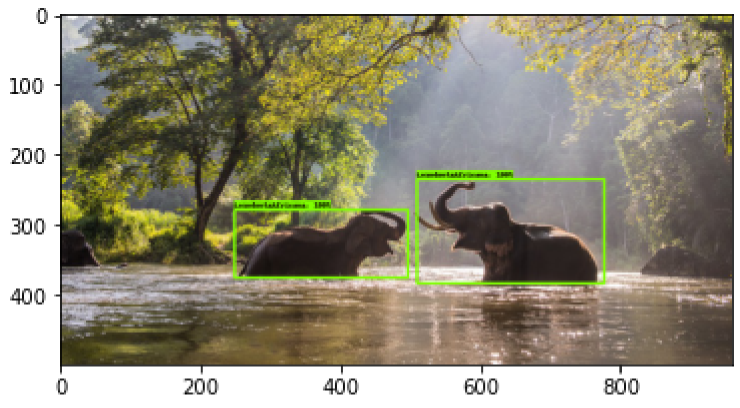
In [8]:

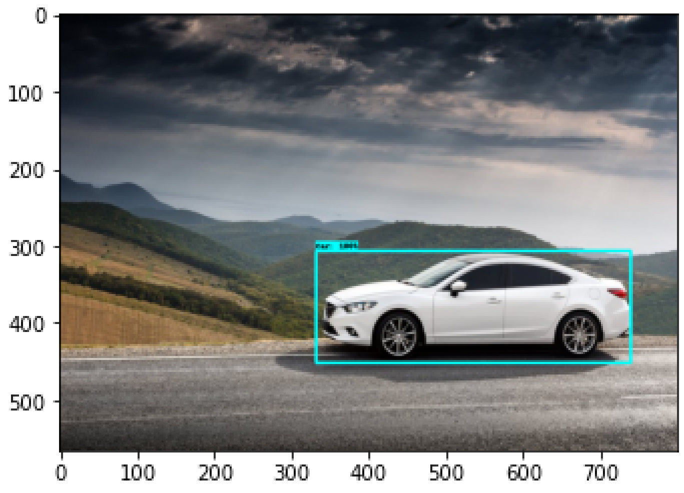
```
category_index = label_map_util.create_category_index_from_labelmap(PATH_TO_L
                                                                    use_displ
```

In [11]:

```
import numpy as np
from PIL import Image
import matplotlib.pyplot as plt
import warnings
import os
warnings.filterwarnings('ignore')   # Suppress Matplotlib warnings

def load_image_into_numpy_array(path):
    """Load an image from file into a numpy array.

    Puts image into numpy array to feed into tensorflow graph.
    Note that by convention we put it into a numpy array with shape
    (height, width, channels), where channels=3 for RGB.

    Args:
      path: the file path to the image

    Returns:
      uint8 numpy array with shape (img_height, img_width, 3)
    """
    return np.array(Image.open(path))


for image_path in os.listdir(IMAGE_PATHS):
    image_path = os.path.join(IMAGE_PATHS, image_path)


    print('Running inference for {}... '.format(image_path), end='')

    image_np = load_image_into_numpy_array(image_path)

    # Things to try:
    # Flip horizontally
    # image_np = np.fliplr(image_np).copy()

    # Convert image to grayscale
    # image_np = np.tile(
    #     np.mean(image_np, 2, keepdims=True), (1, 1, 3)).astype(np.uint8)

    # The input needs to be a tensor, convert it using `tf.convert_to_tensor`
    input_tensor = tf.convert_to_tensor(image_np)
    # The model expects a batch of images, so add an axis with `tf.newaxis`.
    input_tensor = input_tensor[tf.newaxis, ...]
    # input_tensor = np.expand_dims(image_np, 0)
    detections = detect_fn(input_tensor)

    # All outputs are batches tensors.
    # Convert to numpy arrays, and take index [0] to remove the batch dimensi
    # We're only interested in the first num_detections.
    num_detections = int(detections.pop('num_detections'))
    detections = {key: value[0, :num_detections].numpy()
                   for key, value in detections.items()}
    detections['num_detections'] = num_detections

    # detection_classes should be ints.
    detections['detection_classes'] = detections['detection_classes'].astype(

    image_np_with_detections = image_np.copy()

    viz_utils.visualize_boxes_and_labels_on_image_array(
          image_np_with_detections,
          detections['detection_boxes'],
          detections['detection_classes'],
          detections['detection_scores'],
          category_index,
          use_normalized_coordinates=True,
          max_boxes_to_draw=200,
          min_score_thresh=.75,
          agnostic_mode=False)

    plt.figure()
    plt.imshow(image_np_with_detections)
    print('Done')
plt.show()

# sphinx_gallery_thumbnail_number = 2
```

```
Running inference for test_images/Elephant2.jpg... Done
Running inference for test_images/Car2.jpg... Done
Running inference for test_images/Elephant1.jpg... Done
Running inference for test_images/Car1.jpg... Done
```

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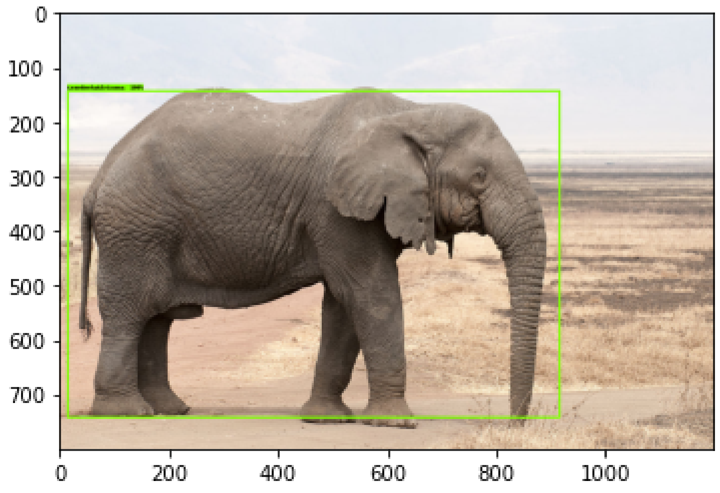
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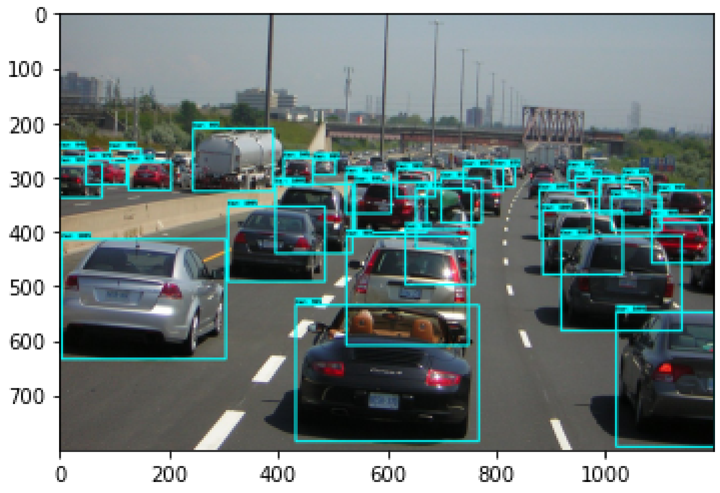
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```
In [ ]:
```

```
In [ ]:
```