

Tensorflow1.x deployed on TPU

- 創出模型架構、訓練並儲存

```
import tensorflow as tf
import numpy as np

graph = tf.get_default_graph()

with graph.as_default():
    inputs = np.array([[0, 0], [0, 1], [1, 0], [1, 1]],
dtype=np.float32)
    targets = np.array([[0], [0], [0], [1]], dtype=np.float32)

    x = tf.placeholder(tf.float32, shape=[None, 2], name='input')
    y_true = tf.placeholder(tf.float32, shape=[None, 1],
name='label')

    weights = tf.Variable(tf.random_normal([2, 1]))
    bias = tf.Variable(tf.random_normal([1]))

    logits = tf.add(tf.matmul(x, weights), bias)
    sigmoid = tf.sigmoid(logits, name='output')

    loss =
tf.reduce_mean(tf.nn.sigmoid_cross_entropy_with_logits(logits=logits
, labels=y_true))
    optimizer = tf.train.AdamOptimizer(learning_rate=0.01)
    train_op = optimizer.minimize(loss)
    saver = tf.train.Saver()

with tf.Session(graph=graph) as sess:
    sess.run(tf.global_variables_initializer())
    for epoch in range(1000):
        _, current_loss = sess.run([train_op, loss], feed_dict={x:
inputs, y_true: targets})
        if epoch % 100 == 0:
            print("Epoch {}: Loss = {}".format(epoch, current_loss))
```

```
save_path = saver.save(sess, './save_model/final-model.ckpt')
```

- 執行上述程式，會得到 `save_model` 資料夾，裡面包含的資料如下

```

▼ save_model
  ≡ checkpoint
  ≡ final-model.ckpt.data-00000-of-00001
  ≡ final-model.ckpt.index
  ≡ final-model.ckpt.meta

```

- 接著取出模型並轉換為 TFLite

```

import tensorflow as tf

graph = tf.get_default_graph()
with graph.as_default():
    with tf.Session() as sess:
        saver = tf.train.import_meta_graph('./save_model/final-
model.ckpt.meta')
        saver.restore(sess, './save_model/final-model.ckpt')
        input_tensor = graph.get_tensor_by_name('input:0')
        output_tensor = graph.get_tensor_by_name('output:0')
        converter = tf.lite.TFLiteConverter.from_session(sess,
[input_tensor], [output_tensor])
        tflite_model = converter.convert()
        with open('./final-model.tflite', 'wb') as f:
            f.write(tflite_model)

```

- 經過加速棒使用 TFLite 模型

```

import tensorflow as tf
import numpy as np
import tflite_runtime.interpreter as tflite
import platform

EDGETPU_SHARED_LIB = {'Linux': 'libedgetpu.so.1' ,
                      'Darwin': 'libedgetpu.1.dylib',
                      'Windows': 'edgetpu.dll'}[platform.system()]

def make_interpreter(model_file):
    model_file , *device = model_file.split('@')

```

環境: tensorflow1.15.2 / python3.7

```
return tf_lite.Interpreter(model_path = model_file ,
                           experimental_delegates =
[tf_lite.load_delegate(EDGETPU_SHARED_LIB ,{'device': device[0]} if
device else {}))
tf_lite_model_path = "./final-model.tflite"
interpreter = make_interpreter(tf_lite_model_path)
interpreter.allocate_tensors()
input_details = interpreter.get_input_details()
output_details = interpreter.get_output_details()
input_data = np.array([[1, 0]], dtype=np.float32)
interpreter.set_tensor(input_details[0]['index'], input_data)
interpreter.invoke()
output_data = interpreter.get_tensor(output_details[0]['index'])
print("Predictions:", output_data)
```