Untitled

June 27, 2018

```
In [ ]: import numpy as np
        import tensorflow as tf
```

1 Constant

```
In [ ]: x = tf.constant(1)
```

```
In [ ]: x.__repr__
```

```
In [ ]: type(x)
```

```
In [ ]: x.__dict__
```

```
In [ ]: y = tf.constant(2)
```

```
In [ ]: print(x)
```

```
In [ ]: print(y)
```

```
In [ ]: x.dtype
```

```
In [ ]: x.shape
```

```
In [ ]: x.op
```

```
In [ ]: x.name
```

```
In [ ]: x.device
```

```
In [ ]: add = x + y
```

```
In [ ]: print(add)
```

```
In [ ]: add.__dict__
```

```
In [ ]: add.dtype
```

```
In [ ]: add.name
```

```
In [ ]: type(add)
```

```
In [ ]: add.op

In [ ]: add.device

In [ ]: x.consumers()

In [ ]: sess = tf.InteractiveSession()

In [ ]: sess.__dict__

In [ ]: sess.run(x)

In [ ]: sess.run(y)

In [ ]: type(sess)

In [ ]: sess.list_devices()

In [ ]: sess.run(add)
```

2 Tensorboard

```
In [ ]: writer = tf.summary.FileWriter("./tensorboard/constant", sess.graph)

In [ ]: x = tf.constant(100)

In [ ]: sess.run(add)

In [ ]: add2 = x + y

In [ ]: sess.run(add2)

In [ ]: writer = tf.summary.FileWriter("./tensorboard/constant", sess.graph)

In [ ]: %whos
```

3 More Constant

```
In [ ]: x1 = tf.constant([5, 10])
        y1 = tf.constant([10, 20])

In [ ]: x1.shape

In [ ]: y1.shape

In [ ]: add2 = x1 + y1

        result = sess.run(add2)

In [ ]: result
```

```
In [ ]: type(result)

In [ ]: x2 = tf.constant(10)
        add3 = x2 + y1

        sess.run(add3)

In [ ]: x3 = tf.constant([[1],
                          [2]])

In [ ]: x3.shape

In [ ]: add4 = x3 + y1

In [ ]: sess.run(add4)

In [ ]: x4 = tf.constant([1,2,3])
        y2 = tf.constant([5,10])

In [ ]: add5 = x4 + y2
```

4 Data Type & Type Cast

```
In [ ]: a = tf.constant(10)
        b = tf.constant(1.5)

In [ ]: a.dtype

In [ ]: b.dtype

In [ ]: add3 = a + b

In [ ]: a = tf.cast(a, tf.float32)

In [ ]: a.dtype

In [ ]: add3 = a + b

In [ ]: sess.run(add2)

In [ ]: writer = tf.summary.FileWriter("./tensorboard/constant", sess.graph)

In [ ]: tf_float32 = tf.DType(tf.float32)

In [ ]: dir(tf_float32)

In [ ]: tf_float32.is_bool

In [ ]: tf_float32.max

In [ ]: tf_float32.size

In [ ]: tf_float32.real_dtype

In [ ]: tf_float64 = tf.DType(tf.float64)

In [ ]: tf_float64.size

In [ ]: tf_float32.is_compatible_with(tf_float64)

In [ ]: sess.close()
```

5 Variable

```
In [ ]: var1 = tf.Variable() #Error
In [ ]: var1 = tf.Variable(10)
In [ ]: var2 = tf.Variable(20)
In [ ]: add_var = var1 + var2
In [ ]: var1.__repr__
In [ ]: print(var1)
In [ ]: var1.get_shape()
In [ ]: with tf.device('CPU:0'):
            var3 = tf.Variable(30)
In [ ]: var3.device
In [ ]: mul_var = add_var * var3
In [ ]: mul_var
In [ ]: sess = tf.InteractiveSession()
In [ ]: sess.run(var1) #Error
In [ ]: tf.global_variables()
In [ ]: init = tf.initializers.global_variables()    #tf.global_variables_initializer
In [ ]: sess.run(init)
In [ ]: sess.run(var1)
In [ ]: sess.run(var2)
In [ ]: sess.run(add_var)
In [ ]: sess.run(mul_var)
In [ ]: writer = tf.summary.FileWriter("./tensorboard/variable", sess.graph)
In [ ]: var_vec = tf.Variable([1,2,3,4,5,6,7,8])
In [ ]: var_vec.shape
In [ ]: var_mat = tf.reshape(var_vec, [2,4])
In [ ]: var_mat.shape
In [ ]: sess.run(tf.initializers.variables([var_vec]))
In [ ]: var_vec.eval(sess)
In [ ]: var_mat.eval(None, sess)
In [ ]: ones = tf.get_variable('ones',shape=[100,100], dtype=tf.float32, initializer=tf.initial
In [ ]: ones.eval(sess)
In [ ]: sess.close()
```

6 Assign

In [ ]:
```
a = 0
b = 1

for i in range(10):
    a = a + b

print(a)
```

In [ ]:
```
a = tf.Variable(0)
b = tf.Variable(1)

sess = tf.InteractiveSession()
init = tf.initializers.global_variables()
sess.run(init)
```

In [ ]:
```
%%timeit

for i in range(10):
    sess.run(a)
```

In [ ]:
```
print(sess.run(a))
```

In [ ]:
```
a.__dict__
```

In [ ]:
```
writer = tf.summary.FileWriter("./tensorboard/assign", sess.graph)
```

In [ ]:
```
sess.close()
```

In [ ]:
```
a = tf.Variable(0)
b = tf.Variable(1)
```

In [ ]:
```
sess2 = tf.InteractiveSession()
init = tf.initializers.global_variables()
sess2.run(init)
```

In [ ]:
```
%%timeit

for i in range(10):
    sess2.run(a.assign(a+b))
```

In [ ]:
```
print(sess2.run(a))
```

In [ ]:
```
sess2.close()
```

In [ ]:
```
a = tf.Variable(0)
b = tf.Variable(1)
```

In [ ]:
```
sess3 = tf.InteractiveSession()
init = tf.initializers.global_variables()
sess3.run(init)
```

```
In [ ]: %%timeit

        for i in range(10):
            sess3.run(a.assign_add(b))

In [ ]: print(sess3.run(a))

In [ ]: writer = tf.summary.FileWriter("./tensorboard/assign", sess3.graph)

In [ ]: sess3.close()

In [ ]: a = tf.Variable(0)
        b = tf.Variable(1)
        a_assign = a.assign(a+b)

In [ ]: sess4 = tf.InteractiveSession()
        init = tf.initializers.global_variables()
        sess4.run(init)

In [ ]: %%timeit

        for i in range(10):
            sess4.run(a_assign)

In [ ]: writer = tf.summary.FileWriter("./tensorboard/assign", sess4.graph)

In [ ]: sess4.close()
```

7 Name and Name Scope

```
In [ ]: with tf.name_scope("mul"):
            with tf.name_scope("add"):
                a = tf.Variable(10, name="a")
                b = tf.Variable(20, name="b")
                add = tf.add(a, b, name="add")

            c = tf.Variable(5, name="c")
            mul = tf.multiply(add, c, name="mul")

In [ ]: sess = tf.InteractiveSession()
        init = tf.initializers.global_variables()

        sess.run(init)

In [ ]: sess.run(mul)

In [ ]: writer = tf.summary.FileWriter("./tensorboard/scope", sess.graph)
```

8 Local vs Global

```
In [ ]: def foo():
            foo_var = tf.Variable(10, name="foo_var")

            return foo_var
```

```
In [ ]: x = foo()
        y = tf.Variable(20, name="y")
```

```
In [ ]: x.__dict__
```

```
In [ ]: x.__repr__
```

```
In [ ]: tf.local_variables()
```

```
In [ ]: tf.global_variables()
```

```
In [ ]: global_var = tf.Variable(1, name="global")
```

```
In [ ]: global_var = tf.Variable(2, collections=[tf.GraphKeys.GLOBAL_VARIABLES], name="global2"
        local_var = tf.Variable(3, collections=[tf.GraphKeys.LOCAL_VARIABLES], name="local")
```

```
In [ ]: tf.local_variables()
```

```
In [ ]: tf.global_variables()
```

```
In [ ]: both_var = tf.Variable(10, collections=[tf.GraphKeys.GLOBAL_VARIABLES, tf.GraphKeys.LOC
```

```
In [ ]: tf.local_variables()
```

```
In [ ]: tf.global_variables()
```

```
In [ ]: sess = tf.InteractiveSession()
```

```
In [ ]: init_global = tf.initializers.global_variables()
        init_local = tf.initializers.local_variables()
```

```
In [ ]: sess.run(init_global)
        sess.run(init_local)
```

```
In [ ]: sess.run(local_var)
```

```
In [ ]: sess.run(global_var)
```

```
In [ ]: sess.run(both_var)
```

```
In [ ]: sess.run(both_var.assign_add(10))
```

```
In [ ]: sess.run(both_var)
```

```
In [ ]: sess.run(init_local)
```

```
In [ ]: sess.run(both_var)
```

```
In [ ]: sess.run(both_var.assign_sub(5))
```

```
In [ ]: sess.run(both_var)
```

```
In [ ]: sess.run(init_global)
```

```
In [ ]: sess.run(both_var)
```