TensorFlow #1

송태호

Machine learning

- **Explicit programming**

- **Machine learning**

  Field of study that gives computers the ability to learn without being explicitly programmed

Learning

- **Supervised learning**

  Training data set

- **Unsupervised learning**

  Word

  Google News group

Supervised learning

- **Regression**

  0 ~ 100

- **Binary classification**

  True, False

- **Multi-label classification**

  A, B, C, D, F

TensorFlow

- **Google**

- **Open source software**

- **Numerical computation using data flow graphs.**

- **Python**

Data Flow Graph

- **Node**

  Mathematical operation

- **Edge**

  Data arrays (tensor)

Hello World

```python
import tensorflow as tf

hello = tf.constant('Hello, TensorFlow!')
sess = tf.Session()

print sess.run(hello)
```

Everything is operation

```python
import tensorflow as tf

a = tf.constant(2)
b = tf.constant(3)

c = a + b
sess = tf.Session()
print sess.run(c)
```

Placeholder

Simply variable

```python
import tensorflow as tf

a = tf.placeholder(tf.int16)
b = tf.placeholder(tf.int16)

add = a + b
mul = a * b

with tf.Session() as sess:
  print "Addition: %i" % sess.run(add, feed_dict={a: 2, b: 3})
  print "Multiplication: %i" % sess.run(mul, feed_dict={a: 2, b: 3})
```

Example

```python
import tensorflow as tf

a = tf.placeholder(tf.int16, name="a")
b = tf.placeholder(tf.int16, name="b")

add = tf.add(a, b)
mul = tf.mul(a, b)
tf.summary.scalar("add", add)
tf.summary.scalar("mul", mul)
with tf.Session() as sess:
    writer = tf.summary.FileWriter('./sample', sess.graph)
    merge = tf.summary.merge_all()
    for i in xrange(20):
        summary = sess.run(merge, feed_dict={a: i, b: i+1})
        writer.add_summary(summary, i)
        print "add: %i" % sess.run(add, feed_dict={a: i, b: i+1})
        print "mul: %i" % sess.run(mul, feed_dict={a: i, b: i+1})

sess.close()
```