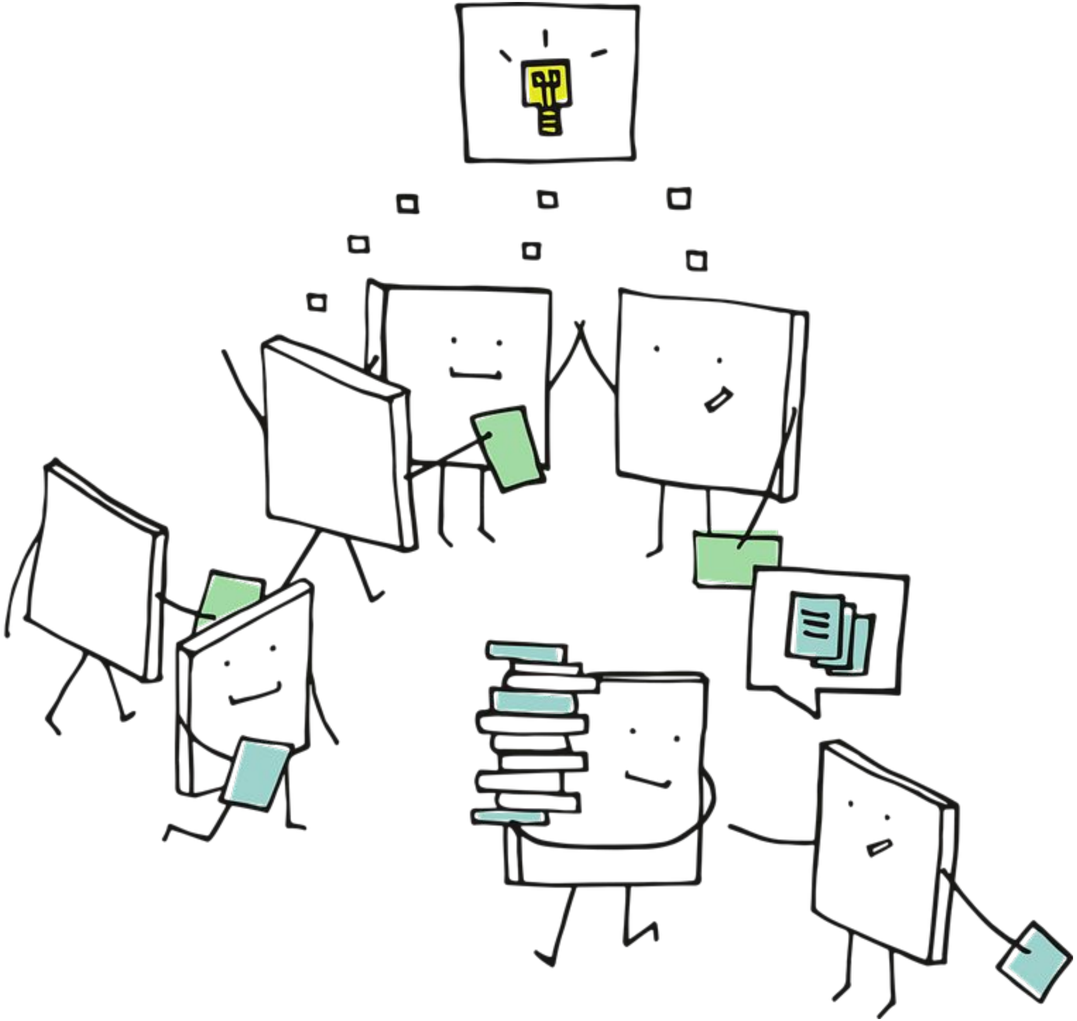


Neural Networks - II

Introduction to Artificial Intelligence

Understanding Gradient Descent

Introduction to TensorFlow

Building a Model using TensorFlow

Recap Day - I

Using Keras with TensorFlow

Building Classification Model in Keras

Understanding Deep Learning

Building Neural Network using Keras

Day - II

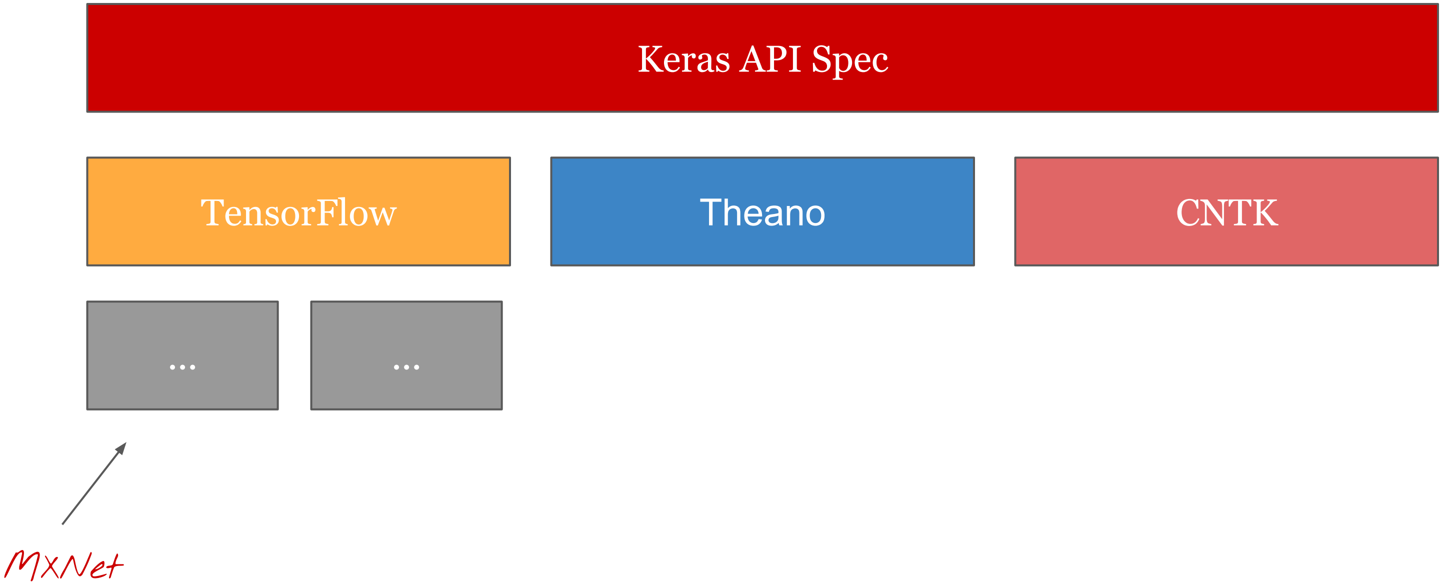
TensorFlow can be tough to learn :(

Keras

Simple

Minimal Code

Powerful



Keras API Spec

TensorFlow

Theano

CNTK

...

...

MXNet

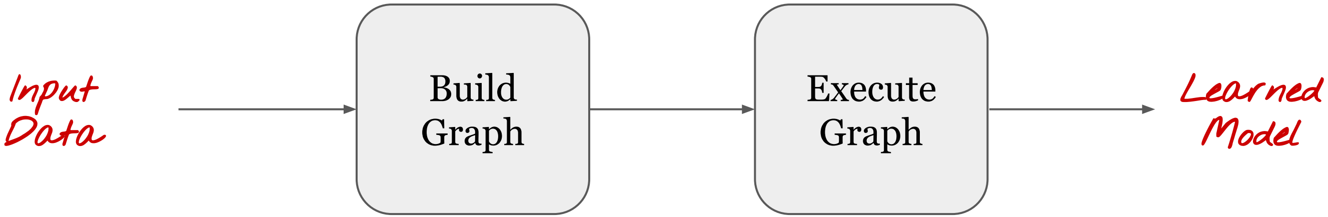
How do we simplify TensorFlow?

Keras is now part of TensorFlow codebase

How can Keras help

Using Keras as part of TensorFlow

Building model in TensorFlow



Building Graph

```
#input features
x = tf.placeholder(tf.float32, shape=[None, 13])

# Actual output
y_ = tf.placeholder(tf.float32, shape=[None])
```

```
#Weights & Bias
W = tf.Variable(tf.zeros([13, 1])
b = tf.Variable(tf.zeros([1]))
```

```
#Prediction
Y = tf.add(tf.matmul(x,W),b))
```

```
#Loss (or Cost)
loss = tf.reduce_mean(tf.square(y - y_))
```

```
#Gradient descent
train_op = tf.train.GradientDescentOptimizer(0.03).minimize(loss)
```

TensorFlow

Keras

```
model = Sequential()

model.add(Dense(1, input_shape=(13,))

model.compile(optimizer='sgd', loss='mse’)
```

Executing Graph

```
#Initialize Graph
Sess = tf.Session()

#Variables need to be initialized before we can use them
sess.run(tf.global_variables_initializer())

#how many times data need to be shown to model
num_iterations = 100
```

```
for epoch in range(training_epochs):

    #Calculate train_op and loss
    _, train_loss = sess.run([train_op,loss], feed_dict={x:features, y_:prices})

    #Print the loss after every 100 iterations
    if epoch % 100 == 0:
        print ('Training loss at step: ', epoch, ' is ', train_loss)
```

TensorFlow

Keras

```
model.fit(features, actual_prices, epochs=100)
```

Where is my model saved?

Saving Model

```
model.save(<file_name>)
```

Install h5py using pip