custom-model-tf1

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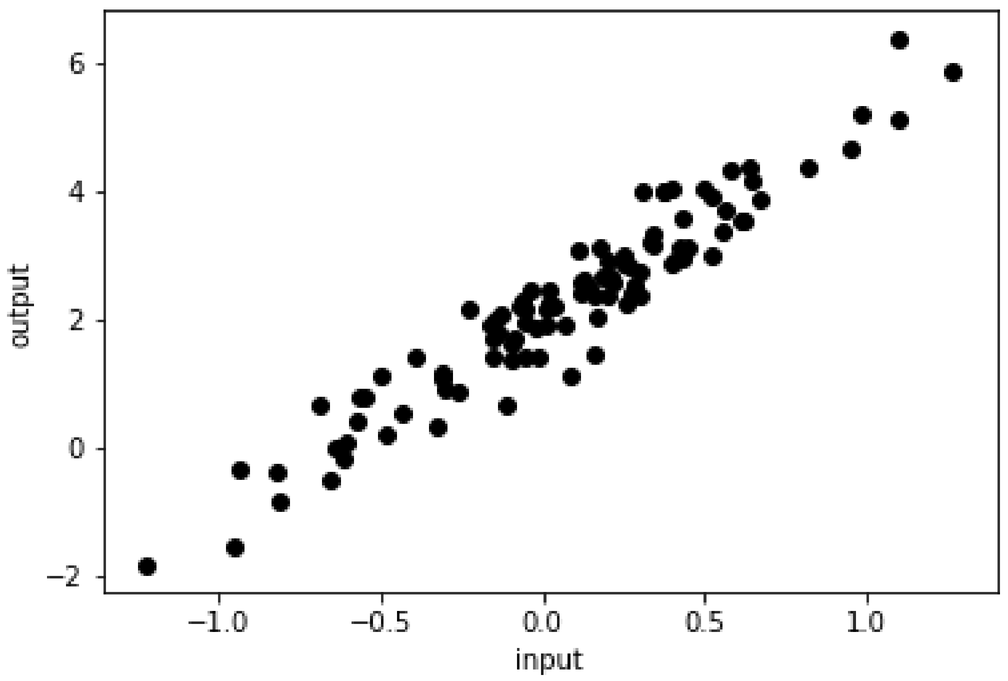
1 Example of custom training in TF1

[1]:
```
import tensorflow as tf
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

2 Build training data

[2]:
```
n = 100
TRUE_W = 3.0
TRUE_b = 2.0

# random samples from normal distribution
np.random.seed(1)
r = np.random.normal(loc=0, scale=0.5, size=n)

# build data
inputs = np.random.normal(loc=0, scale=0.5, size=n)
outputs = TRUE_W * inputs + TRUE_b + r
```

[3]:
```
plt.scatter(inputs, outputs, c='black')
plt.xlabel('input')
plt.ylabel('output')
plt.show()
```



3 Define model

[4]:
```
# graph input placeholders
X = tf.placeholder("float")
Y = tf.placeholder("float")

# trainable variables
W = tf.Variable(5.0, name="weight")
b = tf.Variable(0.0, name="bias")

# linear model
pred = tf.add(tf.multiply(X, W), b)
```

4 Train model

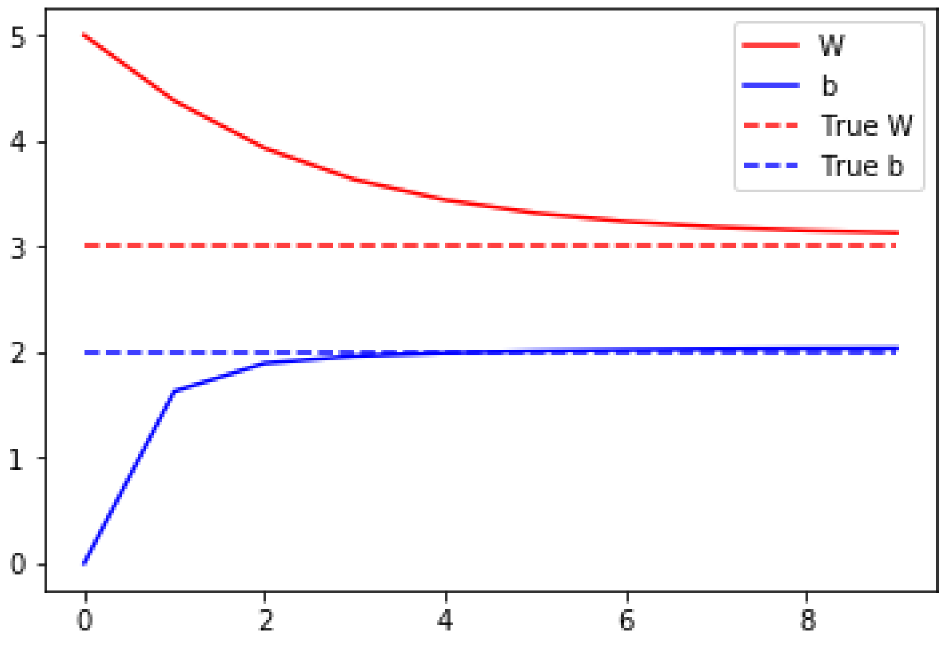
4.1 Setup configurations

[5]:
```
N_EPOCHS = 10
LEARNING_RATE = 0.01

# loss
loss = tf.reduce_mean(tf.square(pred - Y))
```

```
# Gradient descent
optimizer = tf.train.GradientDescentOptimizer(LEARNING_RATE).minimize(loss)

# initialize variables
init = tf.global_variables_initializer()
```

4.2 Execute training

[6]:
```
with tf.Session() as sess:

    sess.run(init)

    Ws, bs = [], []
    epochs = range(N_EPOCHS)
    for epoch in epochs:

        # get variables and loss before training of each epoch
        _W, _b = sess.run([W, b], feed_dict={X: inputs, Y: outputs})

        # record variables
        Ws.append(_W)
        bs.append(_b)

        # train
        for (x, y) in zip(inputs, outputs):
            sess.run(optimizer, feed_dict={X: x, Y: y})

    # plot the evolution of trainable variables
    plt.plot(epochs, Ws, 'r',
             epochs, bs, 'b')
    plt.plot([TRUE_W] * len(epochs), 'r--',
             [TRUE_b] * len(epochs), 'b--')
    plt.legend(['W', 'b', 'True W', 'True b'])
    plt.show()
```


W
b
True W
True b
0
1
2
3
4
5
0
2
4
6
8