Лабораторна робота №8

Тема: «Ресурси Keras. TensorFlow. Навчання лінійної регресії».

Мета: Дослідження ресурсу Keras і TensorFlow. Застосування TensorFlow.

Завдання 1

Було реалізовано наданий код

LR_8_task_1.py

```python
import numpy as np
import tensorflow.compat.v1 as tf
tf.disable_v2_behavior()


n_samples, batch_size, num_steps = 1000, 100, 20000
X_data = np.random.uniform(1, 10, (n_samples, 1))
y_data = 2 * X_data + 1 + np.random.normal(0, 2, (n_samples, 1))

X = tf.placeholder(tf.float32, shape=(batch_size, 1))
y = tf.placeholder(tf.float32, shape=(batch_size, 1))

with tf.variable_scope('linear-regression'):
    k = tf.Variable(tf.random_normal((1, 1), stddev=0.1), name='slope')
    b = tf.Variable(tf.zeros((1,)), name='bias')

y_pred = tf.matmul(X, k) + b
loss = tf.reduce_sum((y - y_pred) ** 2)

optimizer = tf.train.GradientDescentOptimizer(learning_rate=0.0001).minimize(loss)
display_step = 100

with tf.Session() as sess:
    sess.run(tf.global_variables_initializer())
    for i in range(num_steps):
        indices = np.random.choice(n_samples, batch_size)
        X_batch, y_batch = X_data[indices], y_data[indices]
        _, loss_val, k_val, b_val = sess.run([optimizer, loss, k, b], feed_dict={X: X_batch, y: y_batch})
        if (i+1) % display_step == 0:
            print('Epoch %d: %.8f, k=%.4f, b=%.4f' % (i+1, loss_val, k_val, b_val))
```

Успішний запуск

```
Epoch 16800: 394.50201416, k=1.9149, b=1.4102
Epoch 16900: 420.41864014, k=1.9370, b=1.4566
Epoch 17000: 500.10433960, k=1.9549, b=1.4459
Epoch 17100: 338.78945923, k=1.9257, b=1.4397
Epoch 17200: 367.35604858, k=1.9430, b=1.4743
Epoch 17300: 404.56768799, k=1.9072, b=1.4570
Epoch 17400: 472.72360229, k=1.9157, b=1.4695
Epoch 17500: 387.30999756, k=1.9134, b=1.4673
Epoch 17600: 519.55273438, k=1.9677, b=1.4743
Epoch 17700: 443.36917114, k=1.8684, b=1.4435
Epoch 17800: 493.78253174, k=1.9295, b=1.4550
Epoch 17900: 436.32714844, k=1.9278, b=1.4270
Epoch 18000: 398.09454346, k=1.9100, b=1.4158
Epoch 18100: 384.07867432, k=1.9287, b=1.4266
Epoch 18200: 454.90951538, k=1.9219, b=1.4343
Epoch 18300: 393.69277954, k=1.9435, b=1.4070
Epoch 18400: 319.43872070, k=1.9023, b=1.4165
Epoch 18500: 472.64700317, k=1.8926, b=1.4126
Epoch 18600: 405.89630127, k=1.8989, b=1.4212
Epoch 18700: 378.28839111, k=1.9121, b=1.4286
Epoch 18800: 411.20132446, k=1.9186, b=1.4485
Epoch 18900: 466.57583618, k=1.8788, b=1.4498
Epoch 19000: 397.61132812, k=1.9570, b=1.4501
Epoch 19100: 389.72430420, k=1.9582, b=1.4489
Epoch 19200: 459.92294312, k=1.9212, b=1.4356
Epoch 19300: 379.58535767, k=1.9389, b=1.4390
Epoch 19400: 435.43713379, k=1.9484, b=1.4384
Epoch 19500: 446.18014526, k=1.9697, b=1.4462
Epoch 19600: 356.12631226, k=1.9040, b=1.4217
Epoch 19700: 420.82247925, k=1.9760, b=1.4199
Epoch 19800: 386.79855347, k=1.9168, b=1.4355
Epoch 19900: 478.86071777, k=1.8888, b=1.4283
Epoch 20000: 349.39886475, k=1.9447, b=1.4138
```

Посилання на GitHub: https://github.com/missShevel/SHI_Shevel_Olha_IPZ-21-1/tree/master/Lab8