German-Russian Institute of Advanced Technologies

TU-Ilmenau (Germany) and KNTRU-KAI (Kazan, Russia)

**Practice 1**

**«Handwritten digits recognition with tensorflow»**

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During this work, I have learned how to set up the TensorFlow environment properly and how to build a simple TensorFlow’s programs. Also, there was a program about recognizing handwritten digits using tensorflow, which was successfully implemented.

The results of model evaluation are following:

Accuracy: 0.9196

Here is the code listing:

**import** tensorflow **as** tf

**from** tensorflow.examples.tutorials.mnist **import** input\_data

mnist = input\_data.read\_data\_sets("MNIST\_data/", one\_hot=True)

x = tf.placeholder(tf.float32, [None, 784])

W = tf.Variable(tf.zeros([784, 10]))

b = tf.Variable(tf.zeros([10]))

y = tf.nn.softmax(tf.matmul(x, W) + b)

y\_ = tf.placeholder(tf.float32, [None, 10])

cross\_entropy = tf.reduce\_mean(-tf.reduce\_sum(y\_ \* tf.log(y), reduction\_indices=[1]))

train\_step = tf.train.GradientDescentOptimizer(0.5).minimize(cross\_entropy)

init = tf.global\_variables\_initializer()

sess = tf.Session()

sess.run(init)

**for** i **in** range(1000):

batch\_xs, batch\_ys = mnist.train.next\_batch(100)

sess.run(train\_step, feed\_dict={x: batch\_xs, y\_: batch\_ys})

correct\_prediction = tf.equal(tf.argmax(y, 1), tf.argmax(y\_, 1))

accuracy = tf.reduce\_mean(tf.cast(correct\_prediction, tf.float32))

**print**("Accuracy: %s" % sess.run(accuracy, feed\_dict={x: mnist.test.images, y\_: mnist.test.labels}))