
tensorflow / tensorflow
TensorFlow: Open sou
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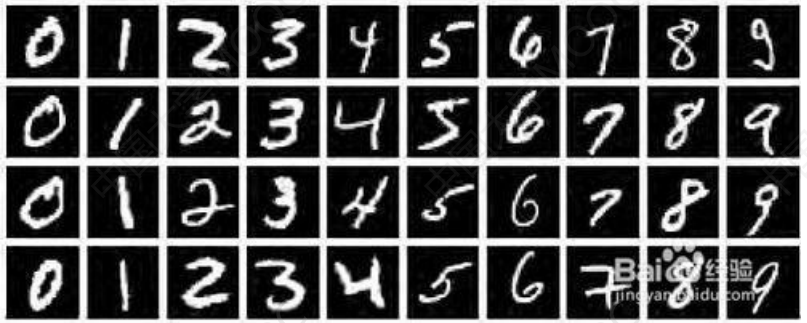
Branches
master

7.3 手写数字数据集

MNIST数据集 Mixed National Institute of standards and Technology database

- New York University，Yann LeCun
- 60000条训练数据和10000条测试数据
- 由250个不同的人手写而成
- 28×28像素，灰度图像
- 存储在28×28的二维数组中



下载MNIST数据集

```
import tensorflow as tf
mnist = tf.keras.datasets.mnist
(train_x, train_y), (test_x, test_y) = mnist.load_data()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11493376/11490434 [==============================] - 18s 2us/step
```

下载路径：C:\Users\Administrator\.keras\datasets\mnist.npz
C:\Users\Lab\.keras\datasets\mnist.npz

当前Windows用户

- 训练集和测试集的长度

```
print("Training set:",len(train_x))
print("Testing set:",len(test_x))
```

运行结果：

```
Training set: 60000
Testing set: 10000
```

- 输出图像数据和标记数据的形状

```
print("train_x:",train_x.shape,train_x.dtype)
print("train_y:",train_y.shape,train_y.dtype)
```

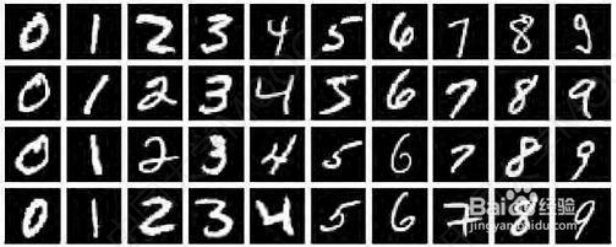
运行结果：

```
Train_x: (60000, 28, 28) : uint8
Train_y: (60000,) uint8
```

显示手写数字图片

- 输出数据集中的第1个样本

```
train_x[0]
```



```
array([[  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       ......
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   3,
         18,  18,  18, 126, 136, 175,  26, 166, 255, 247, 127,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,   0,  30,  36,  94, 154, 170,
        253, 253, 253, 253, 253, 225, 172, 253, 242, 195,  64,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,  49, 238, 253, 253, 253, 253,
        253, 253, 253, 253, 251,  93,  82,  82,  56,  39,   0,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,  18, 219, 253, 253, 253, 253,
        253, 198, 182, 247, 241,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       ......
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0],
       [  0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,   0,
          0,   0]], dtype=uint8)
```

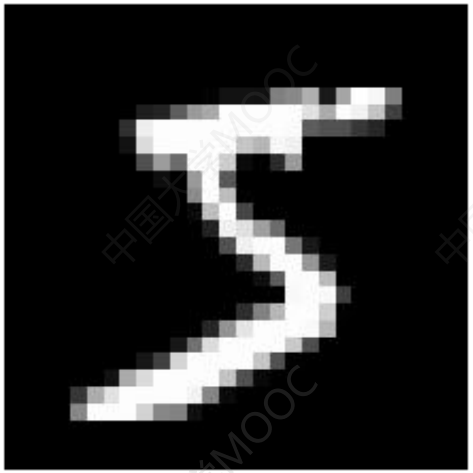
0-黑色；255-白色
数值越大，亮度越高

显示图片

```
import matplotlib.pyplot as plt

plt.axis("off")
plt.imshow(train_x[0],cmap="gray")
plt.show()
```

运行结果：



图片标记

```
>>>train_y[0]
5
```

例：随机显示4幅数字图片

```
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt

mnist = tf.keras.datasets.mnist
(train_x, train_y), (test_x, test_y) = mnist.load_data()

for i in range(4):
    num = np.random.randint(1,50000)

    plt.subplot(1,4,i+1)
    plt.axis("off")
    plt.imshow(train_x[num],cmap='gray')
    plt.title(train_y[num])

plt.show()
```

索引值是**随机**产生的，每次运行结果都会不同