TensorFlow

索引与切片-II

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Selective Indexing

- tf.gather
- tf.gather_nd
- tf.boolean_mask

tf.gather

- data: [classes, students, subjects]
  - [4, 35, 8]

http://www.duesudue.it/eng/dettaglio_servizi.html?ID=3

```
In [46]: tf.gather(a, axis=0, indices=[2,3]).shape
Out[46]: TensorShape([2, 35, 8])

In [47]: a[2:4].shape
Out[47]: TensorShape([2, 35, 8])

In [48]: tf.gather(a, axis=0, indices=[2,1,4,0]).shape
Out[48]: TensorShape([4, 35, 8])

In [49]: tf.gather(a, axis=1, indices=[2,3,7,9,16]).shape
Out[49]: TensorShape([4, 5, 8])

In [50]: tf.gather(a, axis=2, indices=[2,3,7]).shape
Out[50]: TensorShape([4, 35, 3])
```

tf.gather_nd

- data: [classes, students, subjects]

- What if sample several students and their several subjects?

分步采样

- $aa = tf.gather(a, axis, [several\ students])$
- $aaa = tf.gather(aa, axis, [several\ subjects])$

tf.gather_nd

- data: [classes, students, subjects]
- What if sample several (classes and students)?
- $for\ instance$:
  - *[class1_student1, class2_studnet2, class3_student3, class4_student4]*
  - → *[4, 8]*

```
In [55]: a.shape
Out[55]: TensorShape([4, 35, 8])

In [60]: tf.gather_nd(a, [0]).shape
Out[60]: TensorShape([35, 8])

In [61]: tf.gather_nd(a, [0,1]).shape
Out[61]: TensorShape([8])

In [62]: tf.gather_nd(a, [0,1,2]).shape
Out[62]: TensorShape([])

In [63]: tf.gather_nd(a, [[0,1,2]]).shape
Out[63]: TensorShape([1])
```

```
In [55]: a.shape
Out[55]: TensorShape([4, 35, 8])

In [56]: tf.gather_nd(a, [[0,0],[1,1]]).shape
Out[56]: TensorShape([2, 8])

In [57]: tf.gather_nd(a, [[0,0],[1,1],[2,2]]).shape
Out[57]: TensorShape([3, 8])

In [58]: tf.gather_nd(a, [[0,0,0],[1,1,1],[2,2,2]]).shape
Out[58]: TensorShape([3])

In [59]: tf.gather_nd(a, [[[0,0,0],[1,1,1],[2,2,2]]]).shape
Out[59]: TensorShape([1, 3])
```

tf.gather_nd

- recommended indices format:
- [[0], [1],...]
- [[0,0], [1,1],...]
- [[0,0,0], [1,1,1],...]

tf.boolean_mask

```
In [75]: a.shape
Out[75]: TensorShape([4, 28, 28, 3])

In [76]: tf.boolean_mask(a, mask=[True,True,False,False]).shape
Out[76]: TensorShape([2, 28, 28, 3])

In [77]: tf.boolean_mask(a, mask=[True,True,False],axis=3).shape
Out[77]: TensorShape([4, 28, 28, 2])

In [78]: a=tf.ones([2,3,4])

In [79]: tf.boolean_mask(a,mask=[[True,False,False],[False,True,True]])
<tf.Tensor: id=354, shape=(3, 4), dtype=float32, numpy=
array([[1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.]], dtype=float32)>
```

mask是2行3列，对应的是a的前两个维度

下一课时

维度变换

Thank You.