TensorFlow   API r1.4

tf.tensordot

Contents
Aliases:

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- **`tf.linalg.tensordot`**
- **`tf.tensordot`**

```
tensordot(
    a,
    b,
    axes,
    name=None
)
```

Defined in **`tensorflow/python/ops/math_ops.py`** .

See the guide: Math > Tensor Math Function

Tensor contraction of a and b along specified axes.

Tensordot (also known as tensor contraction) sums the product of elements from **a** and **b** over the indices specified by **a_axes** and **b_axes** . The lists **a_axes** and **b_axes** specify those pairs of axes along which to contract the tensors. The axis **a_axes[i]** of **a** must have the same dimension as axis **b_axes[i]** of **b** for all **i** in **range(0, len(a_axes))** . The lists **a_axes** and **b_axes** must have identical length and consist of unique integers that specify valid axes for each of the tensors.

This operation corresponds to **`numpy.tensordot(a, b, axes)`** .

Example 1: When **a** and **b** are matrices (order 2), the case **`axes = 1`** is equivalent to matrix multiplication.

Example 2: When **a** and **b** are matrices (order 2), the case **`axes = [[1], [0]]`** is equivalent to matrix multiplication.

Example 3: Suppose that a_{ijk} and b_{lmn} represent two tensors of order 3. Then, **`contract(a, b, [[0], [2]])`** is the order 4 tensor c_{jklm} whose entry corresponding to the indices (j, k, l, m) is given by:

$$c_{jklm} = \sum_i a_{ijk} b_{lmi}.$$

In general, **`order(c) = order(a) + order(b) - 2*len(axes[0])`** .

Args:

- **a** : **Tensor** of type **`float32`** or **`float64`** .
- **b** : **Tensor** with the same type as **a** .
- **axes** : Either a scalar **N** , or a list or an **`int32`** **Tensor** of shape [2, k]. If axes is a scalar, sum over the last N axes of a and the first N axes of b in order. If axes is a list or **Tensor** the first and second row contain the set of unique integers specifying axes along which the contraction is computed, for **a** and **b** , respectively. The number of axes for **a** and **b** must be equal.
- **name** : A name for the operation (optional).

Returns:

A `Tensor` with the same type as `a` .

Raises:

- `ValueError` : If the shapes of `a` , `b` , and `axes` are incompatible.
- `IndexError` : If the values in axes exceed the rank of the corresponding tensor.

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