

tf.matrix_band_part

Contents

Aliases:

Aliases:

- `tf.linalg.band_part`
- `tf.matrix_band_part`

```
matrix_band_part(  
    input,  
    num_lower,  
    num_upper,  
    name=None  
)
```

Defined in `tensorflow/python/ops/gen_array_ops.py`.

See the guide: [Math > Matrix Math Functions](#)

Copy a tensor setting everything outside a central band in each innermost matrix

to zero.

The **band** part is computed as follows: Assume **input** has **k** dimensions `[I, J, K, ..., M, N]`, then the output is a tensor with the same shape where

$$\text{band}[i, j, k, \dots, m, n] = \text{in_band}(m, n) * \text{input}[i, j, k, \dots, m, n].$$

The indicator function

$$\text{in_band}(m, n) = (\text{num_lower} < 0 \mid\mid (m-n) \leq \text{num_lower})) \ \&\& \ (\text{num_upper} < 0 \mid\mid (n-m) \leq \text{num_upper}).$$

For example:

```
# if 'input' is [[ 0,  1,  2, 3]  
                [-1,  0,  1, 2]  
                [-2, -1,  0, 1]  
                [-3, -2, -1, 0]],  
  
tf.matrix_band_part(input, 1, -1) ==> [[ 0,  1,  2, 3]  
                                         [-1,  0,  1, 2]  
                                         [ 0, -1,  0, 1]  
                                         [ 0,  0, -1, 0]],  
  
tf.matrix_band_part(input, 2, 1) ==> [[ 0,  1,  0, 0]  
                                         [-1,  0,  1, 0]  
                                         [-2, -1,  0, 1]  
                                         [ 0, -2, -1, 0]]
```

Useful special cases:

```
tf.matrix_band_part(input, 0, -1) ==> Upper triangular part.  
tf.matrix_band_part(input, -1, 0) ==> Lower triangular part.  
tf.matrix_band_part(input, 0, 0) ==> Diagonal.
```

Args:

- `input`: A **Tensor**. Rank `k` tensor.
- `num_lower`: A **Tensor** of type `int64`. 0-D tensor. Number of subdiagonals to keep. If negative, keep entire lower triangle.
- `num_upper`: A **Tensor** of type `int64`. 0-D tensor. Number of superdiagonals to keep. If negative, keep entire upper triangle.
- `name`: A name for the operation (optional).

Returns:

A **Tensor**. Has the same type as `input`. Rank `k` tensor of the same shape as `input`. The extracted banded tensor.

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