

## tf.keras.layers.Flatten

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## Class **Flatten**

Inherits From: [Flatten](#), [Layer](#)

Defined in [tensorflow/python/keras/\\_impl/keras/layers/core.py](#).

Flattens the input. Does not affect the batch size.

Example:

```
model = Sequential()
model.add(Convolution2D(64, 3, 3,
                        border_mode='same',
                        input_shape=(3, 32, 32)))
# now: model.output_shape == (None, 64, 32, 32)

model.add(Flatten())
# now: model.output_shape == (None, 65536)
```

## Properties

### **activity\_regularizer**

Optional regularizer function for the output of this layer.

### **dtype**

### **graph**

### **input**

Retrieves the input tensor(s) of a layer.

Only applicable if the layer has exactly one input, i.e. if it is connected to one incoming layer.

Returns:

Input tensor or list of input tensors.

Raises:

- `AttributeError` : if the layer is connected to more than one incoming layers.

Raises:

- `RuntimeError` : If called in Eager mode.
- `AttributeError` : If no inbound nodes are found.

## **input\_mask**

Retrieves the input mask tensor(s) of a layer.

Only applicable if the layer has exactly one inbound node, i.e. if it is connected to one incoming layer.

Returns:

Input mask tensor (potentially None) or list of input mask tensors.

Raises:

- `AttributeError` : if the layer is connected to more than one incoming layers.

## **input\_shape**

Retrieves the input shape(s) of a layer.

Only applicable if the layer has exactly one input, i.e. if it is connected to one incoming layer, or if all inputs have the same shape.

Returns:

Input shape, as an integer shape tuple (or list of shape tuples, one tuple per input tensor).

Raises:

- `AttributeError` : if the layer has no defined input\_shape.
- `RuntimeError` : if called in Eager mode.

## **losses**

### **name**

### **non\_trainable\_variables**

### **non\_trainable\_weights**

### **output**

Retrieves the output tensor(s) of a layer.

Only applicable if the layer has exactly one output, i.e. if it is connected to one incoming layer.

Returns:

Output tensor or list of output tensors.

Raises:

- `AttributeError` : if the layer is connected to more than one incoming layers.
- `RuntimeError` : if called in Eager mode.

## **output\_mask**

Retrieves the output mask tensor(s) of a layer.

Only applicable if the layer has exactly one inbound node, i.e. if it is connected to one incoming layer.

Returns:

Output mask tensor (potentially None) or list of output mask tensors.

Raises:

- `AttributeError` : if the layer is connected to more than one incoming layers.

## **output\_shape**

Retrieves the output shape(s) of a layer.

Only applicable if the layer has one output, or if all outputs have the same shape.

Returns:

Output shape, as an integer shape tuple (or list of shape tuples, one tuple per output tensor).

Raises:

- `AttributeError` : if the layer has no defined output shape.
- `RuntimeError` : if called in Eager mode.

## **scope\_name**

## **trainable\_variables**

## **trainable\_weights**

## **updates**

## **variables**

Returns the list of all layer variables/weights.

Returns:

A list of variables.

## weights

Returns the list of all layer variables/weights.

Returns:

A list of variables.

## Methods

---

### \_\_init\_\_

```
__init__(**kwargs)
```

### \_\_call\_\_

```
__call__(  
    inputs,  
    **kwargs  
)
```

Wrapper around self.call(), for handling internal references.

If a Keras tensor is passed: - We call self.\_add\_inbound\_node(). - If necessary, we **build** the layer to match the shape of the input(s). - We update the \_keras\_history of the output tensor(s) with the current layer. This is done as part of \_add\_inbound\_node().

Arguments:

- **inputs** : Can be a tensor or list/tuple of tensors.
- **\*\*kwargs** : Additional keyword arguments to be passed to **call()** .

Returns:

Output of the layer's **call** method.

Raises:

- **ValueError** : in case the layer is missing shape information for its **build** call.

### \_\_deepcopy\_\_

```
__deepcopy__(memo)
```

## add\_loss

```
add_loss(  
    losses,  
    inputs=None  
)
```

Add loss tensor(s), potentially dependent on layer inputs.

Some losses (for instance, activity regularization losses) may be dependent on the inputs passed when calling a layer. Hence, when reusing a same layer on different inputs **a** and **b**, some entries in **layer.losses** may be dependent on **a** and some on **b**. This method automatically keeps track of dependencies.

The **get\_losses\_for** method allows to retrieve the losses relevant to a specific set of inputs.

#### Arguments:

- **losses** : Loss tensor, or list/tuple of tensors.
- **inputs** : Optional input tensor(s) that the loss(es) depend on. Must match the **inputs** argument passed to the **\_\_call\_\_** method at the time the losses are created. If **None** is passed, the losses are assumed to be unconditional, and will apply across all dataflows of the layer (e.g. weight regularization losses).

#### Raises:

- **RuntimeError** : If called in Eager mode.

### add\_update

```
add_update(  
    updates,  
    inputs=None  
)
```

Add update op(s), potentially dependent on layer inputs.

Weight updates (for instance, the updates of the moving mean and variance in a BatchNormalization layer) may be dependent on the inputs passed when calling a layer. Hence, when reusing a same layer on different inputs **a** and **b**, some entries in **layer.updates** may be dependent on **a** and some on **b**. This method automatically keeps track of dependencies.

The **get\_updates\_for** method allows to retrieve the updates relevant to a specific set of inputs.

This call is ignored in Eager mode.

#### Arguments:

- **updates** : Update op, or list/tuple of update ops.
- **inputs** : Optional input tensor(s) that the update(s) depend on. Must match the **inputs** argument passed to the **\_\_call\_\_** method at the time the updates are created. If **None** is passed, the updates are assumed to be unconditional, and will apply across all dataflows of the layer.

### add\_variable

```
add_variable(  
    name,  
    shape,  
    dtype=None,  
    initializer=None,  
    regularizer=None,  
    trainable=True,  
    constraint=None  
)
```

Adds a new variable to the layer, or gets an existing one; returns it.

#### Arguments:

- `name` : variable name.
- `shape` : variable shape.
- `dtype` : The type of the variable. Defaults to `self.dtype` or `float32`.
- `initializer` : initializer instance (callable).
- `regularizer` : regularizer instance (callable).
- `trainable` : whether the variable should be part of the layer's "trainable\_variables" (e.g. variables, biases) or "non\_trainable\_variables" (e.g. BatchNorm mean, stddev).
- `constraint` : constraint instance (callable).

#### Returns:

The created variable.

#### Raises:

- `RuntimeError` : If called in Eager mode with regularizers.

### add\_weight

```
add_weight(  
    name,  
    shape,  
    dtype=None,  
    initializer=None,  
    regularizer=None,  
    trainable=True,  
    constraint=None  
)
```

Adds a weight variable to the layer.

#### Arguments:

- `name` : String, the name for the weight variable.
- `shape` : The shape tuple of the weight.
- `dtype` : The dtype of the weight.
- `initializer` : An Initializer instance (callable).

- `regularizer` : An optional Regularizer instance.
- `trainable` : A boolean, whether the weight should be trained via backprop or not (assuming that the layer itself is also trainable).
- `constraint` : An optional Constraint instance.

Returns:

The created weight variable.

## apply

```
apply(
    inputs,
    *args,
    **kwargs
)
```

Apply the layer on a input.

This simply wraps `self.__call__` .

Arguments:

- `inputs` : Input tensor(s).
- `*args` : additional positional arguments to be passed to `self.call` .
- `**kwargs` : additional keyword arguments to be passed to `self.call` .

Returns:

Output tensor(s).

## build

```
build(_)
```

Creates the variables of the layer.

## call

```
call(inputs)
```

## compute\_mask

```
compute_mask(
    inputs,
    mask=None
)
```

Computes an output mask tensor.

Arguments:

- `inputs` : Tensor or list of tensors.
- `mask` : Tensor or list of tensors.

Returns:

None or a tensor (or list of tensors, one per output tensor of the layer).

## **count\_params**

```
count_params()
```

Count the total number of scalars composing the weights.

Returns:

An integer count.

Raises:

- `ValueError` : if the layer isn't yet built (in which case its weights aren't yet defined).

## **from\_config**

```
from_config(  
    cls,  
    config  
)
```

Creates a layer from its config.

This method is the reverse of `get_config`, capable of instantiating the same layer from the config dictionary. It does not handle layer connectivity (handled by Container), nor weights (handled by `set_weights`).

Arguments:

- `config` : A Python dictionary, typically the output of `get_config`.

Returns:

A layer instance.

## **get\_config**

```
get_config()
```

Returns the config of the layer.

A layer config is a Python dictionary (serializable) containing the configuration of a layer. The same layer can be reinstantiated later (without its trained weights) from this configuration.



The config of a layer does not include connectivity information, nor the layer class name. These are handled by **Container** (one layer of abstraction above).

Returns:

Python dictionary.

## **get\_input\_at**

```
get_input_at(node_index)
```

Retrieves the input tensor(s) of a layer at a given node.

Arguments:

- **node\_index** : Integer, index of the node from which to retrieve the attribute. E.g. **node\_index=0** will correspond to the first time the layer was called.

Returns:

A tensor (or list of tensors if the layer has multiple inputs).

Raises:

- **RuntimeError** : If called in Eager mode.

## **get\_input\_mask\_at**

```
get_input_mask_at(node_index)
```

Retrieves the input mask tensor(s) of a layer at a given node.

Arguments:

- **node\_index** : Integer, index of the node from which to retrieve the attribute. E.g. **node\_index=0** will correspond to the first time the layer was called.

Returns:

A mask tensor (or list of tensors if the layer has multiple inputs).

## **get\_input\_shape\_at**

```
get_input_shape_at(node_index)
```

Retrieves the input shape(s) of a layer at a given node.

Arguments:

- **node\_index** : Integer, index of the node from which to retrieve the attribute. E.g. **node\_index=0** will correspond to the

first time the layer was called.

Returns:

A shape tuple (or list of shape tuples if the layer has multiple inputs).

Raises:

- `RuntimeError` : If called in Eager mode.

## **get\_losses\_for**

```
get_losses_for(inputs)
```

Retrieves losses relevant to a specific set of inputs.

Arguments:

- `inputs` : Input tensor or list/tuple of input tensors. Must match the `inputs` argument passed to the `__call__` method at the time the losses were created. If you pass `inputs=None` , unconditional losses are returned, such as weight regularization losses.

Returns:

List of loss tensors of the layer that depend on `inputs` .

Raises:

- `RuntimeError` : If called in Eager mode.

## **get\_output\_at**

```
get_output_at(node_index)
```

Retrieves the output tensor(s) of a layer at a given node.

Arguments:

- `node_index` : Integer, index of the node from which to retrieve the attribute. E.g. `node_index=0` will correspond to the first time the layer was called.

Returns:

A tensor (or list of tensors if the layer has multiple outputs).

Raises:

- `RuntimeError` : If called in Eager mode.

## **get\_output\_mask\_at**

```
get_output_mask_at(node_index)
```

Retrieves the output mask tensor(s) of a layer at a given node.

Arguments:

- `node_index` : Integer, index of the node from which to retrieve the attribute. E.g. `node_index=0` will correspond to the first time the layer was called.

Returns:

A mask tensor (or list of tensors if the layer has multiple outputs).

## get\_output\_shape\_at

```
get_output_shape_at(node_index)
```

Retrieves the output shape(s) of a layer at a given node.

Arguments:

- `node_index` : Integer, index of the node from which to retrieve the attribute. E.g. `node_index=0` will correspond to the first time the layer was called.

Returns:

A shape tuple (or list of shape tuples if the layer has multiple outputs).

Raises:

- `RuntimeError` : If called in Eager mode.

## get\_updates\_for

```
get_updates_for(inputs)
```

Retrieves updates relevant to a specific set of inputs.

Arguments:

- `inputs` : Input tensor or list/tuple of input tensors. Must match the `inputs` argument passed to the `__call__` method at the time the updates were created. If you pass `inputs=None`, unconditional updates are returned.

Returns:

List of update ops of the layer that depend on `inputs`.

Raises:

- `RuntimeError` : If called in Eager mode.

## get\_weights

```
get_weights()
```

Returns the current weights of the layer.

Returns:

Weights values as a list of numpy arrays.

## set\_weights

```
set_weights(weights)
```

Sets the weights of the layer, from Numpy arrays.

Arguments:

- **weights** : a list of Numpy arrays. The number of arrays and their shape must match number of the dimensions of the weights of the layer (i.e. it should match the output of **get\_weights** ).

Raises:

- **ValueError** : If the provided weights list does not match the layer's specifications.

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