

tf.keras.layers.Lambda

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Class Lambda

Inherits From: [Layer](#)

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

Wraps arbitrary expression as a [Layer](#) object.

Examples:

```
# add a x -> x^2 layer
model.add(Lambda(lambda x: x ** 2))
```

```
# add a layer that returns the concatenation
# of the positive part of the input and
# the opposite of the negative part
```

```
def antirectifier(x):
    x -= K.mean(x, axis=1, keepdims=True)
    x = K.l2_normalize(x, axis=1)
    pos = K.relu(x)
    neg = K.relu(-x)
    return K.concatenate([pos, neg], axis=1)
```

```
model.add(Lambda(antirectifier))
```

Arguments:

- **function**: The function to be evaluated. Takes input tensor as first argument.
- **arguments**: optional dictionary of keyword arguments to be passed to the function.

Input shape: Arbitrary. Use the keyword argument `input_shape` (tuple of integers, does not include the samples axis) when using this layer as the first layer in a model.

Output shape: Specified by **output_shape** argument (or auto-inferred when using TensorFlow).

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__(  
    function,  
    mask=None,  
    arguments=None,  
    **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,  
    mask=None  
)
```

compute_mask

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

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

```
@classmethod  
from_config(  
    cls,  
    config,  
    custom_objects=None  
)
```

get_config

```
get_config()
```

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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