

# tf.contrib.rnn.MultiRNNCell

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## Class MultiRNNCell

Inherits From: [RNNCell](#)

### Aliases:

- Class `tf.contrib.rnn.MultiRNNCell`
- Class `tf.nn.rnn_cell.MultiRNNCell`

Defined in [tensorflow/python/ops/rnn\\_cell\\_impl.py](#).

See the guide: [RNN and Cells \(contrib\) > Core RNN Cell wrappers \(RNNCells that wrap other RNNCells\)](#)

RNN cell composed sequentially of multiple simple cells.

## 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\_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\_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.

**output\_size**

**scope\_name**

**state\_size**

**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__(  
    cells,  
    state_is_tuple=True  
)
```

Create a RNN cell composed sequentially of a number of RNNCells.

Args:

- `cells` : list of RNNCells that will be composed in this order.

- `state_is_tuple` : If True, accepted and returned states are n-tuples, where `n = len(cells)` . If False, the states are all concatenated along the column axis. This latter behavior will soon be deprecated.

Raises:

- `ValueError` : if cells is empty (not allowed), or at least one of the cells returns a state tuple but the flag `state_is_tuple` is `False` .

## `__call__`

```
__call__(
    inputs,
    state,
    scope=None
)
```

Run this RNN cell on inputs, starting from the given state.

Args:

- `inputs` : 2-D tensor with shape `[batch_size x input_size]` .
- `state` : if `self.state_size` is an integer, this should be a 2-D Tensor with shape `[batch_size x self.state_size]` . Otherwise, if `self.state_size` is a tuple of integers, this should be a tuple with shapes `[batch_size x s]` for `s` in `self.state_size` .
- `scope` : VariableScope for the created subgraph; defaults to class name.

Returns:

A pair containing:

- Output: A 2-D tensor with shape `[batch_size x self.output_size]` .
- New state: Either a single 2-D tensor, or a tuple of tensors matching the arity and shapes of `state` .

## `__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.

## 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(_)
```

## call

```
call(
    inputs,
    state
)
```

Run this multi-layer cell on inputs, starting from state.

## 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).

## 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\_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\_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.

## zero\_state

```
zero_state(  
    batch_size,  
    dtype  
)
```

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