tf.nn.separable_conv2d

```
separable_conv2d(
    input,
    depthwise_filter,
    pointwise_filter,
    strides,
    padding,
    rate=None,
    name=None,
    data_format=None
)
```

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

See the guides: Layers (contrib) > Higher level ops for building neural network layers, Neural Network > Convolution

2-D convolution with separable filters.

Performs a depthwise convolution that acts separately on channels followed by a pointwise convolution that mixes channels. Note that this is separability between dimensions `[1, 2]` and `3`, not spatial separability between dimensions `1` and `2`.

In detail,

```
output[b, i, j, k] = sum_{di, dj, q, r}
    input[b, strides[1] * i + di, strides[2] * j + dj, q] *
    depthwise_filter[di, dj, q, r] *
    pointwise_filter[0, 0, q * channel_multiplier + r, k]
```

`strides` controls the strides for the depthwise convolution only, since the pointwise convolution has implicit strides of `[1, 1, 1, 1]`. Must have `strides[0] = strides[3] = 1`. For the most common case of the same horizontal and vertical strides, `strides = [1, stride, stride, 1]`. If any value in `rate` is greater than 1, we perform atrous depthwise convolution, in which case all values in the `strides` tensor must be equal to 1.

Args:

- `input`: 4-D `Tensor` with shape according to `data_format`.
- `depthwise_filter`: 4-D `Tensor` with shape `[filter_height, filter_width, in_channels, channel_multiplier]`. Contains `in_channels` convolutional filters of depth 1.
- `pointwise_filter`: 4-D `Tensor` with shape `[1, 1, channel_multiplier * in_channels, out_channels]`. Pointwise filter to mix channels after `depthwise_filter` has convolved spatially.
- `strides`: 1-D of size 4. The strides for the depthwise convolution for each dimension of `input`.
- `padding`: A string, either `'VALID'` or `'SAME'`. The padding algorithm. See the comment here
- `rate`: 1-D of size 2. The dilation rate in which we sample input values across the `height` and `width` dimensions in atrous convolution. If it is greater than 1, then all values of strides must be 1.
- `name`: A name for this operation (optional).
- `data_format`: The data format for input. Either "NHWC" (default) or "NCHW".

Returns:

A 4-D `Tensor` with shape according to 'data_format'. For example, with data_format="NHWC", shape is [batch, out_height, out_width, out_channels].

Last updated November 2, 2017.