

Batch norm

Using *batch norm* in tensorflow can be tricky. Some people tend to write their own *batch norm* layer. And using the *batch norm* in *tf.contrib.layers* can be an option for beginners.

As mentioned in the [document](#), we have to add some extra codes to get the batch norm working correctly. Another thing to notice is that, remember to save *global_variables* instead of only *trainable_variables*, because the parameters hidden in the batch norm layer that cover the moving average and variance of the batch data are **NOT** trainable.

```
update_ops = tf.get_collection(tf.GraphKeys.UPDATE_OPS)
with tf.control_dependencies(update_ops):
    train_op = optimizer.minimize(loss)
```