PRIMROSE
Machine Learning Experts

TensorFlow is the most common library used in deep learning. It can be used for other machine learning tasks as well.

Today we will do simple exercises in order to understand the basics of the library. We will begin along the following tutorial:

https://www.tensorflow.org/tutorials/customization/basics

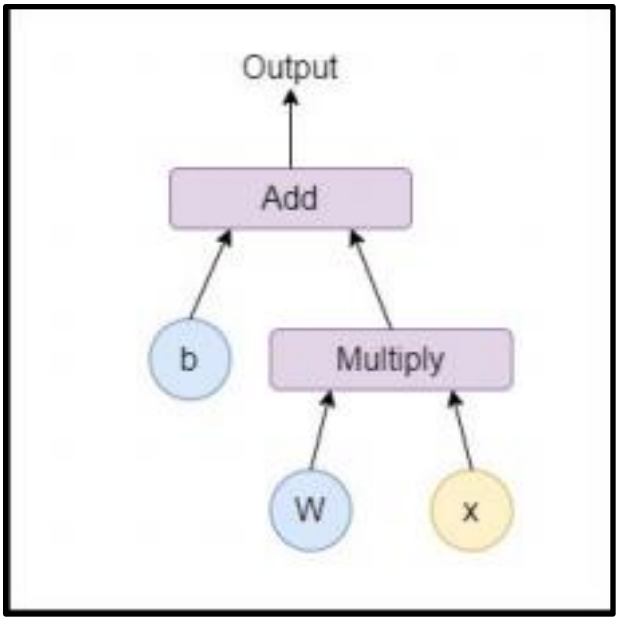
Introduction:

1. Make sure tensorflow is installed on your environment: 'conda install tensorflow'
2. import tensorflow as tf
3. Check your version of tf, use `print(tf.__version__)`
4. Create a constant node (node1) and a Tensor node (node2) with the values [1,2,3,4,5] and [1,1,2,3,5]
5. Perform an element-wise multiplication of the two nodes and store it to node3,
   Print the value of node3, use the .numpy() method
6. Sum the values of the elements in node3, store the result in node4.

Linear Regression:

In this exercise you will define a simple Linear Regression model with TensorFlow low-level API.

For a Linear Model y = Wx+b the graph looks like this:



7. Load the data from the file “data_for_linear_regression_tf.csv".

8. Define a class called MyModel()

9. The class should have two Variables (W and b), and a call method that returns the model's output for a given input value. call method - `def __call__(self, x)`

10. Define a loss method that receives the predicted_y and the target_y as arguments and returns the loss value for the current prediction. Use mean square error loss

11. Define a train() method that does five train cycles of your model (i.e. 5 epochs)

    a. use tf.GradientTape() and the loss function that you have defined to record the loss as the linear operation is processed by the network.

    b. use the tape.gradient() method to retrieve the derivative of the loss with respect to W and b (dW, db) and update W and b accordingly.

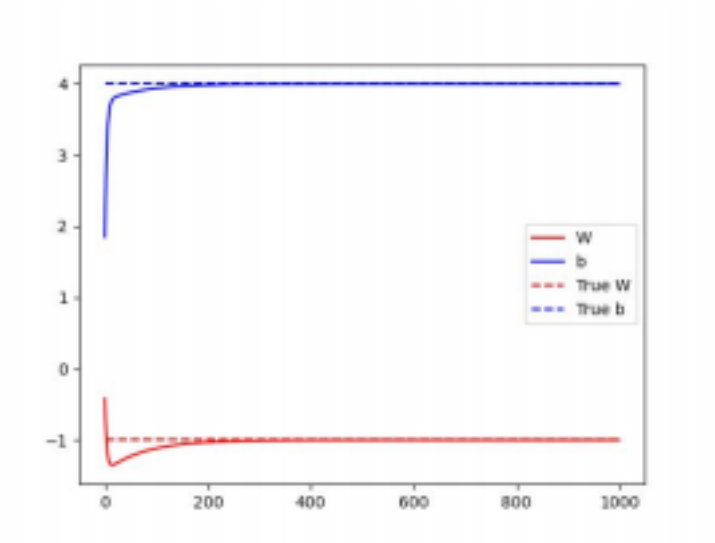
Hint (copy lines to see the hint):

12. Now, use the data to train and test your model:

    a. Train your model for 100 epochs, with learning_rate 0.1

    b. Save your model's W and b after each epoch, store results in a list for plotting purposes.

    Print the W, b and loss values after training



case you have Tensorflow 2.0, you can `import tensorflow.compat.v1 as tf` and immediately run the method `tf.disable_v2_behavior()` in order to use the old version of TensorFlow.