

Matrix Multiplication in TensorFlow

- a) Open the notebook MatrixMultiplication and visualize the computational graph in TensorBoard

Hint: run all cells in the jupyter notebook and then open a terminal and type: `tensorboard --logdir=path/to/log-directory` or run `tensorboard` from the notebook with: `!tensorboard --logdir=path/to/log-directory`

- b) Change the code in the notebook that it divides the matrix multiplication by 10 instead of multiplying it with 10. Compare the numpy and tensorflow results. What do you observe?
- c) Now use a placeholder for `m2` to feed-in values. You must specify the shape of the `m2` matrix (rows, columns).

Linear regression in TensorFlow

- a) Open the notebook Linreg_with_slider and run the first 4 cells and try to minimize the loss by adjusting the parameters `a` and `b`.
- b) Run the next two cells and feed your adjusted parameters through the graph. You have to modify cell 6 a bit.
- c) Now let TensorFlow optimize the parameters in cell 7. Modify cell 7 with the right feeding data.

Hint: Look at the learning rate

- d) Draw the linreg graph and compare your graph with the Tensorboard graph.

Loading Frozen Graph

- a) Open the notebook Loading_Frozen_Graph and run the first 2 cells to load the “art style transfer” graph.
- b) Now read in an image of yourself or some random image (cat, dog, etc.). Replace “bigstock-Standard-Poodle-7733433.jpg” with the name of your image.
- c) Visualize the graph in Tensorboard. Look at the names of the nodes.
- d) Modify cell 10 with the right name of the input node and feed your image through the graph.

Hint: TensorFlow names operation with `n` tensor outputs by default “`op_name:0`”, “`op_name:1`”, ... “`op_name:n-1`”

- e) Optional: Real time art transfer. Write a loop that takes images with your webcam and feeds the images through the graph.