

### Assignment #5: TensorFlow Lab 1

Let's start with some additional explorations of the MNIST data example from Lab 0. Start with the Lab0Ex1.py file or Lab0Ex1.ipynb file (unedited from the zip archive) for the following tasks. **If you need help in answering any of the questions in these first exercises, refer to Moroney's text, Chapter 2.**

#### Task 1:

- Remove the Flatten() layer from the model (the 1<sup>st</sup> element of the list that begins on line 16)
- Try to run this program, write down the error message you get, and then try to explain why that happened.

#### Task 2:

- Restore the Flatten() layer.
- Think about why there are 10 output nodes. Change the number of nodes in the output layer to 5.
- Try to run this program, write down the error message you get, and then try to explain why that happened

#### Task 3:

- Restore the output layer to 10 nodes.
- Add an additional hidden layer with 256 nodes.
- Run this program. What did that do to the results? Why do you think that is?

#### Task 4:

- Remove the extra hidden layer.
- The code that we've been running has two lines of code that normalize the input data (transforming it from the range 0-255 to the range 0-1). Delete these two lines (13-14).
- Run this program. What did that do to the results? Can you explain why that is?

#### Task 5:

- Restore the normalization code.
- In the training that we've been doing we have hard coded the number of epochs, hoping that the error loss falls below a desirable level in that amount of time.
- Download and unzip the new exercise archive that was posted with this assignment. Open Lab1Ex1.py in VS Code or Lab1Ex1.ipynb in Colab and review the source.
- Run this program. What did it do?

Turn in your answers to the questions in this lab via email by Friday, October 4.