Machine Learning and Computational Physics
Fall 2021

Assignement 0

Due: September 1, 2021

Getting started with Python and TensorFlow

This assignment is intended to direct students to the necessary resources and tutorials about programming concepts that will be used in this course. While some of you might have prior experience of coding with Python (and its libraries such as Numpy, TensorFlow etc.), you are highly encouraged to go through the material to revise various concepts.

1 Python basics, NumPy and plotting

(a) https://cs231n.github.io/python-numpy-tutorial/ (recommended).

(b) https://www.w3schools.com/python/ (optional).

(c) https://pythonprogramming.net/matplotlib-python-3-basics-tutorial/ (optional).

2 Basics of TensorFlow and Keras

(a) The beginners tutorial at https://www.tensorflow.org/tutorials (recommended).

(b) https://pythonprogramming.net/introduction-deep-learning-python-tensorflow-keras/ (optional).

Google Colaboratory

We will be using Google Colab for all programming assignments. Colab is basically a combination of Jupyter notebook and Google Drive. The attractive thing about Colab is that it comes preinstalled with many useful packages (like TensorFlow, NumPy etc.), so everyone can use it without worrying about installing correct version and dependencies. Furthermore, it runs entirely on the

cloud and can be launched and used directly through the web browser. Best of all it gives free access to powerful GPUs and TPUs.

If you're interested in learning more about Google Colab, then we encourage you to look at following resources:

- Getting started with Google Colab

- Overview of basic Colab features

In order to use Google Colab one needs to have a Google account and an associated Google Drive. As part of this course, we recommend everyone to use your USC Google account (which comes with Google Drive) and connect to Google Colab. We recommend that you start using Colab from this assignment to get yourself familiar with its workflow.

Few quick notes about Colab and best practices: resources are not always guaranteed and one might not always get top-notch computing resources (this is the price of being free). However, it will always be more than sufficient for all the programming assignments that we will be doing during this course. If your session is idle for a certain time or your total connection time exceeds maximum allowed connection time ($\sim$ 12 hours) in a single session, your Colab VM will disconnect and any unsaved changes will be lost. So, it is highly recommended that you frequently save your progress. Any request for deadline extension or grade reconsideration for lost work due to unsaved changes will not be entertained. To lean more about resource limitations in Colab, please check out their FAQs.